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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with every copy of this week's issue

Means and Ends

WE have to confess that Mr. Harold Macmillan's address last week at Paddington to the Great Western Railway Lecture and Debating Society, reported on page 832, conjured up rather a depressing vision of a bureaucracy likely to be no less stifling to the individual than that of an average dictator country. "Planning," which, in fairly good company, we wish would remain merely a blessed word, is more to Mr. Macmillan; but a fresh breeze comes when he talks about closing "the gap between costs and purchasing power." Planning is a means; increasing the ability of the individual to meet costs is an end; would planning achieve it? It is important to be quite clear in distinguishing between means and ends. Consider a railway company the costs of whose services are too high to be covered by the purchasing power at the disposal of the people; to close that gap is an *end* to which the railway company would subscribe as gladly as the people whose purchasing power is short. Now, in a democracy, which is what this country is supposed to be, it is the proper function of the people to say what they want, and to see that those on whom they lay the responsibility of achieving it do not fail. That, the specification of the *end*, is the function of the people as such: if they go any further and specify also the *means*, they simply remove responsibility from the shoulders that should bear it, and bring about just the sort of chaotic conditions we are now enjoying.

Future American Railway Policy

On October 29 President Roosevelt's special Emergency Board, in presenting its report to him, advised the railways to withdraw their suggested 15 per cent. wage cut, a measure estimated to reduce their aggregate working expenses by some £50 million annually. The reasons for this recommendation are that railway wages are not high when compared with those of comparable industries, and because the savings effected would not be concentrated towards the relief of the most needy railways. Moreover, the board considers, there are indications of improvement in business, and wage reductions are not justified by passing financial troubles. The board also expresses the hope that the railways, in co-operation with the Government, will find some means of evolving a more far-reaching financial policy having greater flexibility, such that future periods of depression will not so adversely affect them. There is no doubt that public opinion shares these views and the railways have since bowed to it. On October 31 the President met the leaders of the railway administrations and of the unions, and reiterated his promise of co-operation in railway rehabilitation, a promise the unions' leader also voiced. It is to be hoped, therefore, that these manifestations of co-operation will enable the railways to eliminate wasteful duplication of services by amalgamation without constant opposition from the unions, and to combat more successfully competition from other forms of transport, sometimes subsidised by the Government.

* * * *

The Week's Traffics

An upward tendency in passenger train receipts is shown by each of the four main companies for the past week in comparison with the corresponding week in 1937. Coal class traffics also show a net improvement of £11,000, but merchandise takings are £112,000 down, so that the total net decrease for the week is £82,000. In the 43rd week the net decrease was £254,000.

	44th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R.	+ 3,000	− 78,000	+ 2,000	− 73,000	− 2,282,000	− 4·05
L.N.E.R.	+ 3,000	− 22,000	+ 10,000	− 9,000	− 1,736,000	− 4·23
G.W.R.	+ 4,000	− 12,000	− 7,000	− 15,000	− 922,000	− 3·90
S.R.	+ 9,000	—	+ 6,000	+ 15,000	− 163,000	− 0·87

In comparison with 1936 the merchandise traffics of 1938 are still showing decreases, as the following table indicates:—

	44th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R.	+ 15,000	− 59,000	+ 12,000	− 32,000	+ 111,000	+ 0·21
L.N.E.R.	+ 13,000	− 14,000	+ 18,000	+ 17,000	+ 177,000	+ 0·45
G.W.R.	+ 7,000	− 10,000	+ 3,000	—	+ 339,000	+ 1·5
S.R.	+ 17,000	+ 1,000	+ 2,000	+ 20,000	+ 627,000	+ 3·49

In the 44 weeks of 1938 passenger train traffics show an improvement of £2,563,000 in comparison with the corresponding period of 1936, and coal receipts are £941,000 up, but merchandise earnings are down £2,250,000.

* * * *

Canadian Railways in 1937

For the year 1937 the Canadian railways' gross earnings collectively totalled $355,103,271 as compared with $334,768,557 in 1936, this being the fourth consecutive year in which an increase has occurred. The proportionate traffic increases are indicated by a 1·9 per cent. rise in ton-mileage and 11·8 per cent. in passenger-mileage. Working expenses, however, also increased from $283,345,968 in 1936 to $300,652,548 in 1937, this rise being accounted for by a $9,411,494 higher cost of maintenance of equipment, whereas way and works expenditure

fell by $2,068,125 during the year. Net income therefore rose from $51,422,589 in 1936 to $54,450,723 in 1937. The route-mileage of line worked was 42,727, a net increase of 175 miles as compared with 1936. The principal increases were 36 miles comprising the first section to be opened of the Senneterre—Noranda branch in Quebec, 147 miles of new line in Saskatchewan and 64 miles in Alberta. These 247 miles were all added to the Canadian National system. Against them, however, must be set 42 miles of Canadian Pacific line in Ontario, and 25 miles of the Vancouver, Victoria and Eastern Railway in British Columbia closed to traffic during the year; there were also other short lengths of line opened and closed.

* * * *

The Silverton Tramway

The Silverton Tramway is in reality a railway of 36 miles on the 3-ft. 6-in. gauge running from Cockburn on the border of South Australia and New South Wales through New South Wales territory to Silverton and Broken Hill, thus forming a link between the railway systems of the two States. It belongs to the Silverton Tramway Co. Ltd. and was opened in 1888. Mining tonnage provides the bulk of the traffic, but in the year ended June 30, 1938, the percentage of other traffic rose from 10 per cent. to 13 per cent. In co-operation with the New South Wales Railways through traffic between New South Wales and South Australia was substantially increased in both directions to the advantage of the company during the financial year under review. This through traffic amounted to 7,759 tons in 1935-36, 6,778 tons in 1936-37, and 16,210 tons in 1937-38. To some extent the larger figures of 1937-38 were due to drought conditions prevailing in New South Wales for the last two months of the year, which accounted for the high tonnages of chaff and salt carried over the company's line from South Australia. Of wool 40,289 bales were carried, which exceeded by 5,000 bales the record tonnage of wool carried in 1936-37. This was largely due to successful co-ordination of transport, whereby a large fleet of motor lorries was instrumental in bringing to rail-head at Broken Hill 11,000 bales from territories as far as 500 miles distant.

* * * *

Increasing Traffic at London Railway Termini

According to a recent analysis of passengers and trains arriving at fourteen of the principal London termini, 1,294,000 passengers use these stations in a day and 4,217 trains arrive at their platforms. Nine years ago these figures were 1,129,000 and 3,786 respectively. The busiest terminus for trains is now Waterloo, with 711 train arrivals and a total of 1,424 trains daily. The largest number of passengers using a station occurs at Liverpool Street, through which 209,000 travellers pass on a weekday, compared with 230,000 passengers nine years ago. London Bridge, Cannon Street, Charing Cross, and Victoria are increasing in popularity, 144,000 more passengers daily passing through these four stations. King's Cross now deals with 63 more arrival trains and Marylebone has 15 additional trains a day; Euston and St. Pancras have increased their trains by 31, and Paddington now handles 180 arrivals, compared with 159 trains into the terminus on an ordinary weekday a decade ago. At Waterloo, 24,300 people arrive in an hour during the morning, and in the evening 22,800 people leave in a similar time. At Liverpool Street these figures are 32,900 and 31,675 respectively. The total number of trains into and out of this terminus on a weekday is 1,288. One of the busiest stations for trains is London Bridge, where, in addition to 940 terminating and starting trains, 575 trains call in each direction, making a total of approximately 2,000 trains a day.

Crises and the Timetable Conference

This year, as we have already recorded, the opening date of the European Timetable and Through Carriage Conference at Budapest was deferred from October 3 to October 10 in view of the international crisis. Even this did not entirely relieve the members from alarums and excursions, for no sooner had the Munich settlement been reached than trouble broke out between Hungary and Czechoslovakia. While the conference was in progress in Budapest partial mobilisation of the Hungarian Army was ordered, and the delegates thus saw much marching and heard much beating of drums; certain street lamps, too, were shaded. Writing in the *L.N.E.R. Magazine*, Mr. A. L. Gibson remarks that it is a strange thing, but a crisis of some sort always seems to occur on the occasions of the timetable conference. When it met in Bucharest, Germany announced her intention of leaving the League of Nations; when the members were assembled at Dubrovnik (Ragusa), the King of Jugoslavia was assassinated; when the conference was at Helsingfors, there was high feeling between Great Britain and Italy over Abyssinia; and when, last year, Stockholm was the meeting place, there was great tension over the Spanish question.

* * * *

Brighton as a Continental Port

Recent correspondence in our contemporary, *Shipbuilding and Shipping Record*, has called attention to the fact that Brighton was once an important cross-Channel port. Although not one of the regular Government packet ports, it had a large Continental trade in the seventeenth century, and by 1790 there was a regular service between "Brighthelmston" and Dieppe. In 1816, the little steamer *Majestic* made the first steam crossing to France and aroused local interest in the possibilities of the route. The Chain Pier was opened on November 25, 1823, and soon the steamer *Rapid* was running regularly to Dieppe, while in 1825 the General Steam Navigation Company arranged a service between Brighton and Dieppe, using the Chain Pier and doing the run in about eight hours. Soon afterwards it became obvious that the service was liable to be irregular, and Newhaven was used as a terminal when weather conditions made landing at the Chain Pier impossible. Later the service was from Brighton and Shoreham to Dieppe, but in 1847 when the Brighton & Continental Steam Packet Company was established in association with the railway, Newhaven was adopted as a permanent base. Since then Brighton's share of the Continental traffic has been on the excursion side. Incidentally, the Chain Pier—the first pier built in Great Britain—was destroyed in the great storm of December 4, 1896.

* * * *

American Fruit Traffic Operation

The late summer and autumn is the period of one of the greatest of the American seasonal traffics—the fruit and vegetable trains moving east from California, and it is estimated that 185,000 fruit vans leave that State every season, about 75,000 of them travelling for over 2,500 miles. All the main lines running from the mid-west to the Pacific seaboard have a share in this traffic, and the difficulties of operation are enhanced by the necessity for the loaded trains to climb the Sierra Nevada range. In particular, the Southern Pacific, which has a peak traffic of over 75,000 car loads in less than ten weeks, has an uphill section comprising 36 miles of 1 in 67 followed by 31 miles at 1 in 42 and then 22 miles at 1 in 56, the total rise being almost 7,000 ft. in 90 miles. A peak movement of over 1,200 cars a day has been found on the Southern Pacific, but as much as 60 per cent. of this total may leave Roseville, at the foot of

the bank, in the four hours from 3.0 p.m. to 7.0 p.m. The Western Pacific Railroad has an almost continuous 1 in 100 grade for 100 miles on end, and the uphill Feather River Canyon section from Oroville to Portola is 117 miles long, and has compensated 10 deg. curves. As on the Southern Pacific, the trains are made up of 65 to 75 refrigerator cars, and a new batch of simple expansion 2-8-8-2 Mallets was delivered recently by the Baldwin Locomotive Works to supplement others of the same design set to work in 1932. Hauling 3,100-ton trains unassisted, the fuel oil consumption of these engines uphill averages 13 Imp. gal. per 1,000 gross ton-miles.

* * * *

Sykes's "Junction Locking" Principle

It would appear that a misunderstanding was caused in the minds of some readers by the mention made of Sykes's "junction locking" principle in our editorial note on the Oakley accident in our issue of September 23, it being supposed that what we referred to was the "point locking," so frequently applied with Sykes's lock-and-block, in which plunging to accept a train locks conflicting points, which must first be correctly set, until the train is disposed of. Sykes's "junction locking" was something quite different and was applied at certain selected places only, its object being to compel a signalman to reverse the facing points at a junction for a clear line before being able to plunge, if he had the other line occupied. The points, once reversed for the clear line, themselves became locked and could not be changed back until the train on the other line had been sent away and all signal movements gone through for it. With both lines occupied, the block plunger remained absolutely locked. In certain cases this principle was extended to cover more than two alternative routes and in some signal boxes near London was applied to cross over junctions. It is believed to have been introduced after an accident many years ago at Loughborough Junction, London Chatham & Dover Railway.

* * * *

The Belships Fleet

"Ready to drive away" is a phrase associated with the motorcar trade rather than the supply of railway locomotives and rolling stock; yet on numerous occasions we have ourselves recorded the delivery to overseas systems of such bulky items in a fully assembled state, ready to be placed in service by the purchaser with the minimum delay. Railway requirements, in fact, called into being the Christen Smith fleet of special motor vessels known as the Belships, and even inspired the choice of the prefix "Bel" for all their names, whence the whole fleet derives its now familiar title. It was the urgent need of the Belgian National Railways for 200 heavy locomotives and tenders ready to be used at once that caused Captain Smith, an officer in the Norwegian Navy and an expert in heavy lifts, to convert two existing cargo steamers on lines embodying his own ideas on the transport of awkward cargoes. The success of the experiment, which enabled the engines to be placed in traffic within 24 hr. of discharge, soon led to a similar commission from the Bombay, Baroda & Central India Railway, and the rapid subsequent development of the fleet is outlined in an article on page 824.

* * * *

Two a Side or Three a Side?

In the design of the latest first class corridor compartment stock for the crack trains of the L.N.E.R. and L.M.S.R., there has been a reversion from the three-a-side to the two-a-side seating plan. The idea, of course, is to give more spacious seats, but we are not sure that the average and even the fairly oversize human frame does not fit more comfortably, armchair fashion, into one-third of a seat than into the excessive amplitude of one-half. Further when a first class compartment is only partly full, each corner, say, being occupied, the middle seat furnishes a convenient no man's land for the journey requisites of the passengers on either side of it. Also at times of pressure the provision of six seats in a compartment may well avoid the necessity for attaching extra stock, or—as has happened not infrequently on the L.N.E.R. Silver Jubilee—for turning away first class passengers owing to lack of accommodation. As a compromise the arrangement of the latest and very comfortable German first class compartment might be tried. In these there are no divisions in the seats, but a supply of loose bolsters or cushions is provided, and these can be arranged to suit the idiosyncrasies of individual passengers, however many there may be up to six in a compartment. An advantage of such a plan is that it gives the first class passenger a more obvious advantage for his money over the third class passenger.

* * * *

Locomotive or Locomotor?

The primary function of a railway locomotive is to haul trains; that is what it is built for, and the designer's efforts are concentrated on the task of making it as efficient as possible for the job. Its main purpose apart, the locomotive can, however, be utilised for other and very useful services. When in steam and during off-duty spells, it is now, by the application of ingeniously devised methods, used on some railways for actuating turntables through the medium of the vacuum brake system, thus rendering itself independent in large degree of manual assistance when the "about turn" order is in operation. Another labour-saving and general economy purpose for which, as described in an article on page 823, the locomotive was recently been pressed into service on an Indian railway is that of pumping the water into the overhead tanks located at branch line terminals and used for storing boiler feed supplies and other running shed requirements. Boiler steam that would otherwise go to waste when the engine finishes its day's work, is used for operating stationary pumps drawing water from an adjacent river or other source, and a large capacity tank can be fully replenished in a third or a quarter of the time occupied by hand-pumping methods. The locomo*tive* thus becomes a locomo*tor* when not actually working its trains.

* * * *

The Lay Helper

From a leader on the railway situation in a very well-known daily we extract the following: "They [the railways] should adopt the new type of vehicle, in use elsewhere, which enables goods to be transported in the same container from field to factory." This *Ex Cathedra Magistri* pronouncement (as well as the accompanying definition of the recommended novelty) deserves neon-lighted italics, for a more brilliant suggestion from non-technical contemporaries we have seldom encountered. Wherefore, shrinking as we do from tarnishing such effulgence, we trust that no offence will be caused if we mention, diffidently from our humble bench, that the circulation (audited and found correct) of containers on British railways at the end of 1937 was fourteen thousand (14,000). . . . One day soon our authoritative friend will be staggering us with the proposal that railways should "adopt" dining cars, electric traction, and continuous brakes, in which case, unable to "contain" ourselves any longer, we shall request the B.B.C. to despatch the whole consignment per "Band Waggon," carefully loaded in "Chestnut Corner." As it is, we are overcome by grief to think that such a famous Express should have to bear the stigma of being reported behind time. . . .

XUM

Railways, Heavy Road Traffic, and the National Interest

THE *Evening Standard* and the *Sunday Express* are doing a valuable public service in continuing to call attention to the serious position of British railways at the present time. For the first 43 weeks of the current year the decline in gross earnings of the four main-line companies is £5,021,000 or 3·67 per cent. in comparison with the corresponding period in 1937. Moreover, the interim statements issued by the companies on the results for the first half of the year made it clear that there is no possibility of a reduction in the cost of operation which would be at all commensurate with the fall in receipts. On the passenger side the decline in traffic receipts has so far been only £196,000, whereas in coal it has been £957,500, and in general merchandise as much as £3,867,500, or 77·03 per cent. of the total decrease in receipts. It has been estimated that £363,490,654 of the preference and ordinary capital of the four companies may have to go without any dividend at all for the year 1938. Of this total some £78,284,735 received nothing in respect of 1937, and on the remaining £285,205,919 the dividends paid amounted to £6,792,865. Preference and ordinary capital on which a reduction in dividend to the extent of perhaps £3,149,950 may have to be faced, is £199,124,227. This capital received £8,337,826 in dividends in respect of the year 1937. Thus, out of the total share and loan capital of £1,102,350,886 of the four companies, £562,614,881, or more than half, is likely to receive either no dividends or a considerably reduced return in respect of the year 1938.

As the railways form a vital link in the nation's transport system, the soundness of their finances is a matter not only for the stockholders, but for the whole of the public, and in particular for the railway employees, who number only some 600,000, against some 846,000 registered stockholders, including financial houses. In the following paragraphs the *Evening Standard* makes an interesting suggestion for the present desperate situation.

"An attempt to rehabilitate railway earnings by reduction of railwaymen's wages would be a deplorable solution; and the efficacy of a further increase in railway charges is highly questionable. It follows that, unless the taxpayer is to be asked to make up railway net income to a level at which the invested capital would secure a reasonable return, the Government must act on other lines. It must see that the railways do not operate far below their capacity while other forms of transport, free from the statutory obligations under which the railways have been placed by Parliament, divert from the railroads traffic which should go by rail.

"The failure of the railways to keep pace with the general increase in production and trade which this country enjoyed between 1932 and 1937 has been due primarily to the steady diversion of goods traffic to our increasingly congested roads.

"Consignment of heavy goods by road means in many cases not merely that revenue is lost to the railways, but that other road users are obstructed, road surfaces for which tax revenue has paid are seriously damaged, and the roads prevented from functioning properly as arteries for swift-moving traffic.

"The practical solution is to confine to the railways the bulk of the country's goods traffic. That done, the railways would be assured a revenue adequate to pay for maximum efficiency. In return for the monopoly rights conveyed, they could fairly be required to maintain standards of speed and economy comparable with the best attainable on the roads."

As has been so often pointed out, the users of road transport for goods which could well bear a reasonable increase in charges are really acting detrimentally to the trade of the country as a whole, as by their action they prevent relief being accorded to the heavier and lower rated traffics which for the most part go by rail. We do not hear of the consumer getting any benefit from the lower transport charges for the higher-priced commodities, and he actually has to pay more for the upkeep of roads which carry them.

* * * *

Stopping Unofficial Strikes

THE recent labour dispute on the London Midland & Scottish Railway, which arose from the employment of a non-member of the National Union of Railwaymen, and which at one time looked like spreading to the other main-line railways was—thanks to the firm attitude adopted by the management—happily settled, but the considerable pecuniary loss suffered by the company and the inconvenience to which the company's customers were subjected cannot be forgotten. Much has already been written concerning the origin, the course, and the circumstances of the ending of the dispute, yet regarding the matter in retrospect we cannot but feel real uneasiness concerning the situation which was created; indeed, the more we reflect upon the root causes of the trouble, and upon the attitude of the trade union during the dispute, the more we are disturbed.

Let us review the facts concerning the relationship existing between the railway companies and the railway trade unions. For many years the unions and the staff have enjoyed the benefits which accrue from recognition by the railway companies of the principles of collective bargaining and, perhaps, the "high light" of this recognition was attained by the passing of the Railways Act, 1921, whereby statutory recognition was given to a scheme of machinery of negotiation under which the three railway trade unions had joint rights with the newly constituted four main-line railway companies. After some ten years of operation of that scheme it was re-modelled and a carefully planned new scheme was brought into operation by an agreement signed in February, 1935. It would seem that the parties to the Agreement then had in mind the possibility of the occurrence of the very sort of unofficial strikes which recently took place at St. Pancras, for we find that Clause 18 of the Agreement specifically contemplates such an event. It provides that in no circumstances shall there be any withdrawal of labour, or any attempt on the part of the employee to hamper the proper working of the railway until any matter in dispute has been submitted through the proper channels to the higher management; or if such matter is within the scope of the agreement, until the provisions thereof have been fully utilised. Clause 19 lays down that the railway trade unions shall not afford any support to individuals who withdraw labour, or hamper the proper working of the railway. Moreover, the unions undertook to use "their best endeavours" to induce such individuals to conform to this agreement.

It is pertinent to ask whether or not these two clauses were fully implemented in connection with the St. Pancras stoppage. Before, however, the question is answered let us consider the privileged position in which the railway staffs find themselves. It can fairly be claimed that in no other industry is there such a comprehensive provision of machinery of negotiation as on the railways in this country, but quite apart from the machinery, every regular railway employee has the right of direct access to

the management in regard to any matter affecting his employment. Furthermore, every such employee is entitled to have recourse to the approved disciplinary procedure, and in addition, every such employee is free to submit direct to the management any suggestion in regard to the working of the railway. Further, every employee receives rates of pay and works hours of duty under conditions of service determined by a series of national agreements. Other advantages enjoyed by railway servants are continuity of employment, and security of tenure, the advantage of which it would be difficult to overestimate.

The stoppage at St. Pancras arose solely on a question of trade union membership. No other issue was in dispute. Now, it has been the consistent attitude of the railway managements that, while granting recognition to the unions, the companies do not concern themselves whether or not their employees are union members. Complete freedom of choice has always existed on the railways. "Liberty of action"—words which the trade union movement knows well—is the key-note.

We come, then, to the question that seeing members of the railway trade unions enjoy privileges of employment which are probably unequalled in any other large-scale industry in the country, does not the possession of such privileges carry certain obligations? If we were to enumerate such obligations we would place on the top of the list the paramount duty of co-operating with the railway management to ensure at all times, and in all circumstances, the maintenance of the services provided for the convenience of the companies' customers. When, as in the case of the stoppage at St. Pancras, employees fail in this prime duty of "giving service," it is fair to ask how the parties to the bargain of February, 1935, have carried out their undertakings. It cannot be denied that the companies have scrupulously adhered to the terms of the several national agreements. It is equally beyond question that the group of strikers at St. Pancras broke the undertaking given on their behalf by their unions not to "withdraw their labour or hamper the proper working of the railways."

The economic situation of the railway industry today is a matter of serious concern, not merely for the country and for the 800,000 stockholders, but also for the 600,000 employees, whose very livelihood depends upon the prosperity of the railways. Any unwarranted cessation of the services provided for the railways' customers, hampers the working of the railways, and injures their prestige and credit with the public. The keenness of the competition which the railways have to face from operators of road transport—and of which every day brings fresh evidence—is an added reason for railway employees to take the necessary steps to ensure that the St. Pancras tragedy of October, 1938, is never repeated. We believe that those responsible for the destinies of the N.U.R. have also the interests of the railway industry at heart, and we feel sure that, on reflection, they will recognise that to countenance the hampering of the working of the railways for such unsubstantial reasons as existed at St. Pancras, is an act both dangerous and foolish.

We submit that the N.U.R. and other trade unions have a simple remedy at their disposal for stopping unauthorised strikes. They should alter their rules of membership so that any member taking part in an unauthorised strike automatically ceases to be a member of the trade union and cannot rejoin for a period of five years. In the case of the St. Pancras trouble, had this rule been in operation, the unauthorised strikers would have placed themselves in the ludicrous position of themselves being non-unionists just like their non-unionist colleague.

South African Railways and Harbours

THE financial year of the South African Railways and Harbours ends on March 31, and the full report for the twelve months to March 31, 1937, was analysed in THE RAILWAY GAZETTE of February 18, 1938, at page 293. In addition the administration publishes a shorter report for each calendar year. During the calendar year 1937 the revenue derived from the transport services of the administration (railways, road services, harbours, steamships and airways) reached the record figure of £39,004,967, and expenditure totalled £32,045,148. In addition, appropriations were made of £5,700,595, leaving a surplus of £1,259,224 for the calendar year 1937. Adding the surplus of £1,703,824 carried forward from 1936 gives a total surplus of £2,963,048, out of which have been appropriated sums amounting to £1,870,000 leaving a net surplus at the end of December, 1937, of £1,093,048.

In terms of the revised Mozambique Convention, not less than 47½ per cent. of the total tonnage of commercial sea-borne goods traffic imported into the Transvaal competitive area is secured to the port of Lourenço Marques. With a view to reducing the volume of imports to the Transvaal competitive area through Lourenço Marques, certain reductions in rates on high-rated goods traffic from Durban, Port Elizabeth, and East London to the competitive area were effected in January and in October, 1935, with the result that the proportion of traffic imported into the competitive area *via* Lourenço Marques was reduced from an average of 59·76 per cent. in 1934 to 57·31 per cent. in 1935, and 53·62 per cent. in 1936. For the first ten months of 1937 the average was 52·07 per cent. Figures relating to railways are compared in the accompanying table:—

	1937	1936
Passenger journeys	102,756,027	94,930,124
Goods and minerals, tons	19,945,580	17,237,124
Coal traffic, tons	9,652,813	9,761,723
Route miles open	13,263	13,263
Train-miles	59,328,242	54,070,147
Operating ratio, per cent.	67·11	64·09
	£	£
Passenger receipts	5,734,912	5,617,910
Goods and mineral receipts (other than coal)	21,339,170	20,021,549
Coal traffic receipts	3,697,809	3,755,370
Total earnings	33,260,538	31,762,008
Gross working expenditure (including depreciation)	22,322,175	20,357,588
Surplus over expenditure	10,938,363	11,404,420
Surplus over interest	6,289,790	6,618,234

Passenger journeys increased by 8·24 per cent., but the improvement in passenger revenue was only 2·08 per cent. The disparity between these percentages is partly accounted for by the greater average length of journey in 1936 due to the Empire Exhibition at Johannesburg. In goods and minerals the increase in tonnage was 15·71 per cent., and in receipts the improvement was 6·58 per cent. It is expected that the 12 diesel railcars for which tenders were called on October 19, 1937, will be placed in service on certain specially selected sections of line during the financial year 1938-39. The administration has approved of the ordering from overseas during the financial year 1938-39 of 146 steam locomotives, 36 electric locomotives, two electric motor coaches, 500 bogie goods wagons, and 1,000 four-wheeled goods wagons at a total estimated cost of £2,819,338. Negotiations are in progress for the elimination of 190 more level crossings. A substantial part of the electrification of 131½ route miles in the Witwatersrand area had been completed at the end of 1937. Rail concessions granted to the public during the year are expected to involve a surrender of £452,400.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

The Ever-Open Eye

Thos. Cook & Son, Ltd.,
Berkeley Street, W.1
November 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Thomas Cook never sleeps!

Yours faithfully,
A. CURTHOYS
Press Service

P.S.—Inspired by your paragraph:—

"Is this the face that launched a thousand trips?"—
—Reflection of a tourist on seeing Thomas Cook asleep.

Timetables

University of Puerto Rico,
Rio Piedras, P.R., U.S.A.
October 13

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with great interest the series of recent letters on British public timetables. May I submit the following considerations on the problem?

It seems to me that, in order to attain greatest clarity and brevity, among the fundamenal principles of timetable construction should be:—

1—Each table should show only one route, or such a section thereof as can be conveniently shown. Tables showing four or five routes at once are unwieldy, confusing, and waste space. Most people would prefer to look up two or more separate tables, rather than get hopelessly lost in one huge table.

2—Each train in the table should be shown only once.

3—Only *through* connections—*i.e.*, trains running directly without change—should be shown, and only to a very few of the most important points off the route treated in a given table. If connections involving a change of trains are to be shown, this should be done very sparingly, and the necessity of change should be shown by a difference in type, special symbols, or the like.

4—Each train should have a separate number—or, in the case of services with head-codes like the Southern Electric, these should be indicated for each train, to enable ready identification. (I have in earlier days had a bad time at stations like East Croydon or Tulse Hill, trying to identify my train from the timetable and not knowing the head-codes.)

5—Much space can be saved in tables showing branch lines with infrequent service, by placing the column of stations in the middle, and the up and down services in the columns on either side. Almost all countries except Great Britain do this in their public timetables.

By applying the above criteria to such tables as the 76-page "London and the South Coast" table in the Southern Railway book, a great deal of space could be saved, and clarity improved. For example, the section showing the down trains on weekdays could be reduced from 24 pages to 12, or 50 per cent. The six routes contained therein, if shown separately and compactly, without unnecessary repetition, could be given in the following space:—

1—London—Brighton 2—Brighton—Worthing—Littlehampton—Bognor—Portsmouth	6 pages (each page containing one 30-col. frame of each table, printed sidewise on the page as at present)
3—Mid-Sussex line: Three Bridges—Horsham—Littlehampton—Bognor ..	1½ pages
4—Horsted Keynes—Haywards Heath—Lewes	1 page
5—Brighton—Lewes—Eastbourne—Hastings	3 pages
6—Lewes—Seaford	½ page
	12 pages

Even though the rest of the Southern book might not be compressed as much, nevertheless at least one-third of the space now used might be saved. The same holds true for tables of the other main-line companies, although to a smaller extent, as they do not indulge in such monster portmanteau tables as the Southern.

As an example of good timetable construction, I would like to point to the *Orario Generale* for Italy, published by Fratelli Pozzo of Turin. This table is very clear, legible and intelligible, and it is from comparing the *Orario Generale* with the British tables that I elaborated the principles set forth above.

Yours faithfully,
ROBERT A. HALL, JR.

Electric Motors for Cranes

British Thomson-Houston Co. Ltd.,
Rugby, October 18

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In your issues of August 19 and 26, Mr. Dalziel has given a comprehensive review of the electrical equipment for cranes and similar plant for load handling. He states that the power supply is now almost universally three-phase alternating current, but points out that the slip-ring induction motor has the outstanding defect for crane working that it lifts light loads and the empty hook at practically the same rate as it lifts the full load. Further it can act as a brake only by generating back into the mains when running above normal rated speed. Mr. Dalziel therefore recommends in most cases of importance conversion to direct current and the use of d.c. motors.

As Mr. Dalziel was the pioneer in this country in the application of the variable speed shunt characteristic a.c. commutator motor (Schrage type) to the drive of the hydraulic pumps used on many railway installations, it may interest him and also many of your readers to know that this type of motor has in recent years been applied with great success to wharfside and workshop cranes of various types and sizes. Their suitability for this duty has been brought about by the development of motors with speed ranges of 20 to 1 or even higher. Without the use of brakes, and by the movement of a single control handle, complete control of speed can be obtained under any condition from empty hook to full load hoisting or lowering. Any lowering under load, at whatever speed is desired, is done with power returned to the supply by the motor acting as a generator, and thus high efficiency and great economy are obtained under every condition. The extent of braking and accelerating is limited only by the rate at which it is found convenient to move the brushgear.

A large number of cranes has been equipped with this type of motor, ranging from 5 h.p. to 180 h.p. on the hoist, with speed ranges varying from 10/1 to 40/1. They have proved very valuable wherever it was essential that very slow speed working be achieved with certainty and ease at any load value and without great skill on the part of the operator. Cranes for foundries, railway locomotive shops, paper mills, power stations and ship fitting, are among the various types to which the three-phase a.c. commutator motor has been applied with great success.

A more exact knowledge of the characteristics and commutation of the single-phase a.c. commutator motor of the repulsion type has enabled us to build single-phase motors which are very suitable for fast crane work. This motor has a basis series characteristic and the speed and direction of rotation are controlled by brush shifting. It is both simple and economical and requires the minimum of control gear. The starting torque is dependent on the brush position, and anything from zero to four times full load torque at starting can be obtained. The motor can be so designed that the speed is never likely to be excessive when lowering a load, and power may be returned to the line under this

condition instead of being wasted on a brake. Further, the motor may be brought to rest and reversed quite smoothly by movement of the brush lever without the necessity of applying the mechanical brake. Brush maintenance is low as the result of experience and careful design.

Installations of single-phase repulsion motors for crane work in this country include three coal-grabbing cranes in two large power stations, each crane equipped with a 52-h.p. hoisting motor, a 10-h.p. slewing motor, and a 20-h.p. travelling motor. These and other smaller installations are giving complete satisfaction as regards ease of operation, suitability of characteristics, and maintenance.

From the above comments I hope I have indicated that in recent years great advances have been made in the design and application of three-phase and single-phase a.c. commutator motors, and that for powers up to 250 h.p. practically all requirements can be met by one or other of the various types of three-phase and single-phase a.c. motors.

Yours faithfully,

H. JACK,
Chief A.C. Engineering Department

Locomotive Driver or Engineer?

The Institution of Locomotive Engineers,
28, Victoria Street, Westminster, S.W.1,
November 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with interest the correspondence appearing in your publication of November 4 on the above subject, and, with your permission, would like to make the following comments:—

Mr. Squance in his letter agrees that the Associated Society of Locomotive Engineers & Firemen is for men whose occupation is that of driving and firing locomotives. He claims, however, that, as they have many duties of a technical nature to perform, they are entitled to be called "engineers."

I am afraid technical engineers will not endorse this claim, as there is a vast difference between what they (technical engineers) are expected to know and what enginemen have learnt through their daily occupation. From time immemorial, the footplate men have been designated as "driver and fireman" respectively and, when referred to together, as "enginemen." One has only to refer to engine shed rosters, notices and time sheets to confirm this. Any notices posted in a running shed for the attention of "engineers" would, we may assume, be looked at askance, if not ignored by the drivers attached to the shed as not being their concern.

Mr. Squance will appreciate that there should be some distinction in designation between men who drive locomotives and those who design, build, and maintain them, so that some change therefore would appear to be long overdue, and it is hardly to be expected that the "designer, builder," &c., will change his designation of "locomotive engineer," as that title is definitely in line with the title of other technical engineers, such as automobile, mining, aeronautical, &c.

Yours faithfully,

H. A. HARRISON,
Secretary

London, S.W.1, November 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—As a student of railway phraseology, may I suggest that the question put to the Secretary of the Associated Society of Locomotive Engineers & Firemen should have been phrased as follows?: "How many locomotive engineers are members of your society and what are their qualifications?" Today the term "engineer," in such a context, is of course an Americanism, but perhaps like many Americanisms it is a survival of some common English practice which antedates even the locomotive engine. It would be interesting to trace its etymological pedigree.

Yours faithfully,

GEORGE L. BOAG

PUBLICATIONS RECEIVED

The Railway Handbook, 1938-39. London: The Railway Publishing Co. Ltd., 33, Tothill Street, S.W.1. 8½ in. × 5½ in. 96 pp. Paper covers. Price 2s. 6d. net.—This is the fifth annual edition of "The Railway Handbook," which, under no fewer than one hundred separate headings, provides short articles and statistics on practically every phase of British railway operation. Two years ago the contents of the handbook were completely rearranged so as to bring the statistics into juxtaposition with the relevant explanatory articles. This order has been continued in the present edition with minor changes. Many of the sections have been extensively revised, particularly those relating to railway speeds and non-stop runs. Owing to a later publishing date it has been found possible to include more up-to-the-minute British statistics than in the handbook's parent publication, "The Universal Directory of Railway Officials and Railway Year Book." An innovation this year is the addition of a chart showing locomotive type names and wheel arrangements.

Dati Statistici. (Statistical Data.) Ministry of Communications, Rome. 4 Volumes. Paper. 13 in. × 9¼ in.—These bulky volumes, in the Italian language, contain the voluminous statistics compiled by the Office of the Inspection of Railways, Tramways, and Automobiles, of the Italian Government. Of the four volumes, one, No. IV of 1936, refers to the years 1931-1932-1933 and contains the data relating to miscellaneous forms of transport. The three remaining volumes refer to 1934 and are dated 1937. Volume I (301 pages) contains the statistics relating to private railways and interurban tramways; Volume II (596 pages) those referring to automobile and road transport services generally; and Volume III (277 pages) to miscellaneous transport. In Volume I the tramway system is fully described and details are given as to length and traffics, illustrated very clearly with graphics in each case, and compared with several earlier years. A good map is appended. Volume II gives full details of all bus services throughout the country, number of licences, fares, and other statistics; and Volume III corresponds for the year 1934 to Volume IV of 1936, containing the data relating to miscellaneous transports, that is, urban tramways, buses and motorcars, inland waterway transport, funicular railways, aerial cableways, and public lifts. This volume also is illustrated by diagrams and a good map. In view of the rapid increase in the development of road transport during recent years, it is to be regretted that it should not be possible to publish these interesting statistics at an earlier date.

Winter Sunshine.—The 1938-39 issue of the Winter Sunshine handbook, which places before the tourist all the facilities offered by Thomas Cook & Son Ltd. for spending this winter in the cheerful atmosphere of North Africa, the Continent, and the south and west of England, has recently been issued and can be obtained from all this company's offices.

Hull, Britain's Cheapest Port.—An attractive booklet pointing out the amenities and economies of Hull, Britain's third port, for the location of new industrial works, has been issued by the City of Hull Development Committee. It is printed in colours, and full of interesting statistics and information of the maximum value. Copies may be obtained from the Town Clerk, Hull.

Unit Heaters.—The principle of the unit heater is that fresh air is drawn by a fan from outside a room or building and passed through heating apparatus before delivery within. The fans are driven by electric motors, compactly incorporated into the design of the units, a large number of which can therefore be accommodated in strategic positions on industrial premises. A folder showing representative units and installations reaches us from Keith Blackman Limited, 27, Farringdon Avenue, London, E.C.4, maker of the Blackman Streamline fan. All sizes of units have totally-enclosed motors. Heating is by steam, using pressures up to 150 lb. per sq. in.

THE SCRAP HEAP

BEHIND WITH THE NEWS

Scene: An arterial road near London: A disabled delivery van belonging to *The Star* being towed garagewards.

What a reverse! Hitching the star to a wagon. . . .

* * *

In March, 1901, a scheme for a direct electric railway route from east to west of England was reported by the *Engineer* to be on foot. The promoters had in view an entirely new railway from Harwich to Porth Dinaleyn, in Wales, and another railway connecting with this at Leicester from Hull, the total cost of which, with necessary appliances and dock accommodation at Forth Dinaleyn, was estimated at about 20 millions sterling. The motive power to be provided from electric generating stations placed at intervals along the route, and communicated to the train through a trolley wire.

* * *

At Welwyn North, L.N.E.R., it is frequently necessary to transfer wagons from the sidings on one side of the main line to those on the other side, and this work is performed with the aid of a shunt horse. One which is quite a local character is a 12-year-old black shunt horse named *Tom*. After a short experience of their surroundings these animals remain perfectly calm even when expresses pass by

* * *

SUCH IS FAME

Railway workers at St. Pancras and Euston junctions, on the Great Western Railway system, may come out on strike if a decision to that effect is taken by a meeting of the Executive of the National Union of Railwaymen summoned for tonight.—*Extract from the "Palestine Post," sent to us by Mr. B. Townsend of Thos. Cook & Son Ltd., Jerusalem office.*

* * *

ZONE TICKETS IN YORKSHIRE

Apparently the old Yorkshire custom of making the most of a good bargain is applied with enthusiasm during the summer months to the railway "zone tickets" or weekly tickets allowing the holder to travel anywhere within a certain radius as often as he likes. Hull, in particular, is stated to be one of the places which has been getting full value for money. It is just possible to enjoy the delights of Scarborough and at the same time return by train to Hull for meals, with the result that quite a number of zone ticket holders of Hull appear to have made six journeys a day between Hull and Scarborough. Although the tickets are "not transferable," it is in fact difficult to ensure that they are not transferred. Whole families are believed to have been proceeding to the seaside by instalments—each member on arrival posting his ticket back home for the next. This practice inspired the *Yorkshire Post* some time ago to publish the following elegant verse:—

"Mother goes on Monday with the dog and little Gert.,
And sends the tickets back again for Dad and brother Bert;
Dad then posts them home again for me and Auntie Nell,
Oh, aren't these lovely tickets, that the railway companies sell."

* * *

Every year, on this continent, some 2,000,000 car wheels are worn out, through the loss of some 15 lb. of metal from each, or a total loss of 30,000,000 lb. Also, some 60,000,000 lb. of rail steel disappears each year, due to wear. This loss of metal requires replacement of 700,000 tons of wheels and 1,500,000 tons of rail annually. Evidently the factor of wheel-rail abrasion is of vast economic importance.—*From "Canadian Transportation" for October, 1938.*

* * *

TALLYMEN OF THE RAILWAY

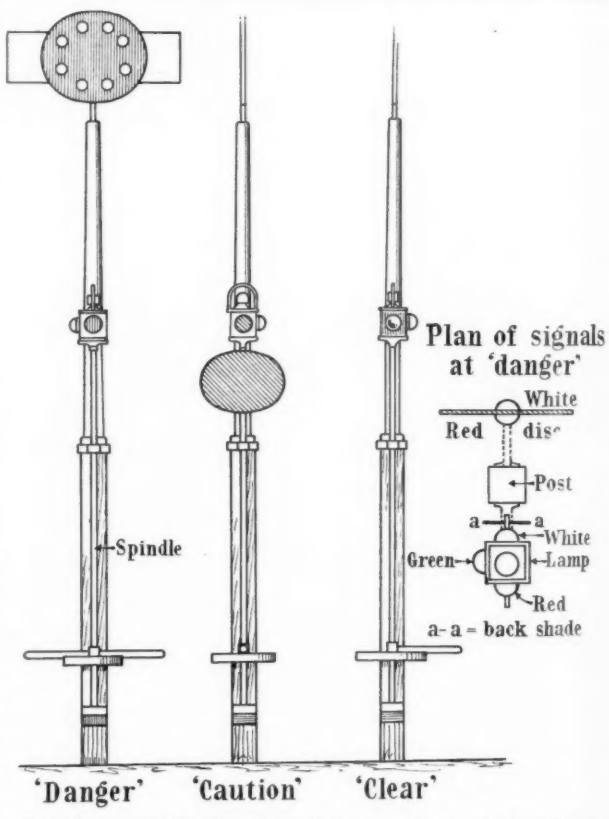
Five tallymen are employed by the G.W.R. as part of the company's organisation for the distribution of necessary supplies to the 1,500 stations on the system. The men operate from Swindon, the main supply depot, and travel in special vans attached to passenger trains. The vans leave Swindon for their respective districts each Monday, returning at weekends for restocking purposes. Few people have seen these men at work for the vans are attached to the back of trains which stay for only a few minutes at each station. The time of their arrival is known to the station staff, who await the train with the old articles to be exchanged, and in a few minutes the tallyman has replaced these with new ones.

No money passes, but upon arrival back at Swindon the Accountant's Department gets busy charging up the stations with the cost of the new goods supplied, from the label attached to the old ones. The interior of the tallyman's van resembles a small warehouse. It is packed full with towels, dusters, sponge-cloths, buckets, dustbins, coal-shovels, water cans, lamps, burners, padlocks, barrel taps, shunting poles, pillows, brushes, rugs, smocks, and a dozen or more other things required in the daily routine of a station. Thirteen different types of brushes and brooms alone are carried and these vary from scrubbing brushes to blacking brushes, and from 14-in. hair brooms for sweeping platforms to those made of steel wire for cleaning cattle pens. The tallymen have to work rapidly for their time at a station is limited, in some cases to as little as a minute.

* * *

The rain had stopped, and a railway drayman was removing from his dray a large tarpaulin sheet. This he laid across the road before folding it just as a lorry dashed round the corner.

The vehicle ran straight across the sheet, and the drayman, looking up with astonishment, said very loudly: "Well I'm dashed! Who d'yer think I am—Sir Walter Raleigh?"—*From The "Evening News."*



One form of disc signal used for time interval signalling on the London & Birmingham Railway. This type of signal lasted for many years on parts of the L.N.W.R. system but eventually gave place to the semaphore pattern

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

SOUTH AFRICA

Cape Town Harbour Development Scheme

Work upon the £6,000,000 scheme for the development of Table Bay Harbour, which includes a rectangular basin approximately 6,000 ft. long by 2,000 ft. wide is now well in hand. As described in The Special Overseas Number of THE RAILWAY GAZETTE last year, this project also provides for the reclamation of 363 acres of the city foreshore and a new passenger station and goods marshalling yard, enabling a much-needed replanning of certain parts of the city area to be carried out.

In the first stage in this ambitious undertaking a contract was recently let for the dredging and reclamation work, one of the largest ever let in South Africa. Work is already in hand, and in the first two months about 500,000 cu. yd. of material were dredged and deposited in the area to be reclaimed.

The New 7,000-ft. Mole and Deep Water Berths

The rudiments of the new 7,000-ft. mole, which will jut out from Woodstock beach in the direction of the existing South Arm Return Knuckle to form the seaward boundary of the enlarged basin, can already be detected in the temporary staging being constructed on the site of the new mole for the purpose of erecting steel sheet pile-driving apparatus. Such good progress is being made with the new deep-water berths which will eventually lie at the foot of Adderley Street that the first of them will be ready in a few months' time.

Open-Line Works

Among the more important open-line improvement works recently begun are the following:—

	Estimated cost £
Improved traffic and workshop facilities at Pretoria	1,217,300
New goods and marshalling yard at Prospect Township, Johannesburg	488,000
Doubling of line between Uithoek and Glencoe, Natal main line...	147,464
Durban—Port Shepstone: new bridges over Illovo and Umzimbazi rivers and deviation of line	118,661
Doubling of 13 miles of track between Canada and India junctions, Witwatersrand ...	110,055

Other new works approved for beginning in the current financial year will entail an estimated total expenditure of some £6,500,000. Chief among these is the regrading and straightening of the Cape Eastern main line between East London and Queenstown at an estimated cost of £1,500,000, the major portion of which will begin shortly. Particulars of some of the other important works in this category are enumerated below:—

	Estimated cost £
Regrading and improvement of line between Germiston and Volksrust	600,000
Improved traffic and locomotive depot facilities at Port Elizabeth	368,000
Improvements to mechanical workshops at Salt River, East London, and Bloemfontein ...	142,105
New high-level bridge over Vaal River at Fourteen Streams ...	105,702
Improvements to line between Canada junction and Orlando...	81,516
New road-motor repair shops at Cape Town, Port Elizabeth, and Pietermaritzburg	71,000
Subway at Stuckeris Street, Cape Town	70,000
Doubling of line between Minnaar and Witbank	69,294
Establishment of flash-butt welding depots	60,000

NORTHERN IRELAND

Conference between Prime Minister and Railways

A recent conference at Stormont, Belfast, between the Prime Minister, Viscount Craigavon, and representatives of the Great Northern and the London Midland & Scottish Railways, together with officials of the Transport Board, is giving rise to speculation on the possibility of the amalgamation of the railway undertakings.

Questions in Parliament concerning the M'Lintock Report

In the Northern House of Commons recently, questions concerning the report of the M'Lintock Committee on Northern Ireland transport problems, which is expected to be issued shortly, were answered by the Prime Minister. He intimated that the reports of the M'Lintock Committee and of the Recorder of Belfast would be issued to members of both Houses and the press immediately on receipt of the former, whether Parliament was in session or not. He also said that the conference with the railways was not based on the recommendations of the M'Lintock report, about which the Government had as yet no knowledge or forecast.

EIRE

Cork-Dublin-Cork Train Service

The Great Southern Railways have retained in their winter timetable the acceleration of the morning train from Cork to Dublin and of the evening train from Dublin to Cork. During previous summers the 7.45 a.m. Cork to Dublin was discontinued between Thurles and Dublin, and a fast train left Cork at 9.0 a.m., arriving Dublin at 1.0 p.m. This train picked up at Thurles the intermediate passengers beween Cork and Thurles served by the 7.45 a.m., but the arrival at 1.0 p.m. was too late to transact any business until after lunch time.

This year the 7.45 a.m. was altered to serve the principal intermediate stations between Cork and Thurles and run non-stop from that station, arriving in Dublin at 11.50 a.m., thus taking four hours five minutes for the 165½ miles, with eight intermediate stops. The idea of the earlier arrival was to give some time needed for business before lunch and more time generally in Dublin. Passengers arriving in Dublin at 11.50 a.m. have now until 6.20 p.m. before the return journey.

The evening train from Dublin to Cork in the winter was scheduled for 5.0 p.m.; for summer traffic the 5.0 p.m. was discontinued between Limerick Junction and Cork, and the through train left Dublin at 6.20 p.m. running non-stop to Thurles. This service, which has been continued this winter, provides a connection off the day mailboat from Holyhead, due at Dun Laoghaire at 5.25 p.m., which was not previously given during the winter months.

The population of Cork, which is a port serving a large part of the South of Ireland, is about 80,000. Having regard to the potential passenger traffic with Dublin it is economically impossible to provide a complete non-stop service between the two cities. So far it can hardly be said that the improved facilities have been warranted, but the company's action in making the experiment has been appreciated by the Cork Chamber of Commerce, whose council unanimously decided to convey its appreciation of the action of the company.

CANADA

Rebuilding Portneuf River Bridge, C.P.R.

The Portneuf River bridge on the Quebec line of the Canadian Pacific Railway was washed out by abnormal floods and traffic interrupted on September 1. In point of fact there had been unusual rainfall in the area drained by the river for the previous three months, and then three downpours approaching cloudbursts swept away houses and finally undermined the 85-ft. high pier No. 2 of the C.P.R. bridge, which fell, carrying the two 85-ft. plate girder deck spans it supported with it.

Arrangements were quickly made to replace these spans and build two wooden trestle piers to support them, one on each side of the site on which a new permanent pier would be built. On September 3 and 4, however, there were further deluges, and the whole west bank of the river began to slide carrying pier No. 1 with it. When movement ceased, a temporary timber pier was erected to support No. 1 span, and the permanent pier was

dismantled by hand, for fear lest dynamiting might throw it on to No. 2 span which lay in the river bed. On September 5 new plans and estimates were prepared, substituting a 105-ft. span for the original 85-ft. No. 2 span, and forecasting that the bridge would be temporarily repaired and able to pass traffic by September 24. Despite further heavy rain and impassable roads this schedule was bettered by two days, and the first public train passed over the bridge on September 22, a material train having crossed it the previous evening safely. This remarkably fine piece of work—including the building of two 85-ft. timber trestle piers and a new concrete No. 1 pier, as well as the erection of one 105-ft. and one 85-ft. girder span at a level 85 ft. above river level—was thus accomplished in 16 days, with great credit to all concerned, as the *Canadian Pacific Staff Bulletin* justly claims, in an article from which the above facts were abstracted.

New Station in Saskatoon

The construction of a new passenger station at Saskatoon has been begun by the Canadian National Railways, and the new building has been designed to form a complementary group with the railway-owned Bessborough Hotel. The new station will be 60 ft. back from the street line, and the space occupied by the present station is to be turned into an approach drive with grass plots and shrubs.

QUEENSLAND

Increases in Freights and Fares

To offset the cost of increased salaries and wages amounting to £380,000, and the contribution of £32,500 which the railway department will have to make to the National Insurance Scheme as from January 1 next, the Queensland Government has announced an all-round increase of 5½ per cent. in railway freights and fares as from November 1, 1938. This is expected to yield for the remaining eight months of the financial year an additional revenue of £266,000. The last increase in freights and fares was made in July, 1932, but since that date wool freights have been reduced by 10 per cent. on two occasions, and other concessions have been granted.

UNITED STATES

New Zephyr Train with More Powerful Band Brakes

The Chicago, Burlington & Quincy Railroad has ordered another four-car, stainless steel streamlined diesel-electric train, making the ninth in its well-known Zephyr fleet. The new train will be used in pair with an existing Zephyr to provide two daily round trips at high speed between Kansas City and St. Louis. This latest Zephyr will embody a number of innovations, among them band brakes on discs mounted between the wheels, instead of the ordinary brake shoes bearing on wheel treads. Experiments indicate that this type of brake can bring one of these trains from 100 m.p.h. to a stop in a distance of 2,000 ft. without discomfort to passengers. Each car will have a subsidiary diesel-electric power plant which will provide light, heat, and air-conditioning. Fluorescent lights—a new type of illumination which is said to approximate natural daylight—will be installed in the train.

CEYLON

Mechanical Accounting to be Introduced

With a view to introducing a mechanical system of accounting on the Government Railway, two British manufacturing firms are being allowed to demonstrate their machines, which are expected in Colombo almost at once. In the first instance they will be used only for certain classes of statistical work, but if successful, the system will be extended to other branches of accounting. The experiments will extend over several months, entirely at the cost of the manufacturers, and the railway administration will be under no obligation to purchase the machines from any particular firm.

INDIA

Cyclone Disturbs Railway Communications

A severe cyclone accompanied by torrential rain struck the Ganjam District in Orissa on October 9, and caused breaches on the East Coach section of the Bengal-Nagpur Railway. The ballast from the track between Khallikote and Rambha stations was completely washed away, and the line was rendered unsafe for the passage of trains. The line between Chicacole Road and Urlam was submerged for a length of about four miles. Train services in these areas had to be suspended. The first breach has now been repaired. The Madras mails have been running *via* the Raipur-Vizianagram route since the dislocation on the East Coast section.

Hydro-dynamic Research on Railway Bridges

The Central Hydro-dynamic Research Station near Poona carried out important investigations bearing on the construction of railway bridges during the past year. As already mentioned in THE RAILWAY GAZETTE, experiments on models are in progress in connection with a proposal to build a railway bridge across the Brahmaputra at Amingaon on the Eastern Bengal Railway, where the river is about half-a-mile wide. Experiments so far carried out were designed to reproduce conditions similar to those at the bridge when the same discharge was flowing and to determine scour caused by the maximum flood and the effect on scour of introducing piers and guide banks. A suitable alignment for the bridge has accordingly been proposed and recommendations made for guide banks and pitching. The question of the amount of scour round the piers is under investigation.

Experiments are also being made with a large scale model of the Ganges above the Hardinge bridge to ascertain what changes are likely to occur in the river course during the next few years. In order to make sure that the results of the experiments correctly show what will actually happen, it was decided to have some preliminary experiments to see if the changes which had occurred in the river in the past could be reproduced in the model. Although the course adopted in the model is not identical with that of the original, the general conditions of flow, it is reported, have been correctly reproduced.

"Divali Specials" and Tours

The Great Indian Peninsula Railway administration has introduced return tickets at liberal concessions, and holiday season tickets available over the entire system and over specified zones during the Divali holidays. In order to facilitate traffic and relieve congestion on the daily trains, the railway administration has decided to run, as an experimental measure, additional Divali special trains every day from October 21 to 25 between Bombay and Delhi, and between Bombay and Poona. These trains will run at the speed of mail trains and will halt only at important stations.

Eight standard round tours have been mapped out by the G.I.P.R. covering different parts of India. The tickets for these tours which are available for three months and are issued for all classes, enable the traveller to see India at a very cheap cost, and visit the beautiful and historic cities, the holy places of pilgrimage, and the great business centres that are to be found throughout the country.

ARGENTINA

Engineering and Transport Meetings

A meeting of the Buenos Aires branch of the Institution of Electrical Engineers was held on August 25, at which Mr. C. G. Cousins, B.Sc., A.M.I.E.E., of the electrical staff, Chief Mechanical Engineer's Department, Central Argentine Railway, read a paper, illustrated by lantern slides, on "The Air-conditioning of Trains," with special reference to his railway's air-conditioned express *El Cordobés*. Mr. C. G. Barker, Chairman of the branch, presided.

At another meeting of the same branch, held on September 23, Mr. J. K. Clark of the Metropolitan-Vickers Company, delivered a lecture, "A Review of the Electric Traction Systems of Europe," with a brief outline

of the history of their development. Mr. G. W. Munday, Vice-Chairman, presided.

At a meeting of the Argentine and River Plate Centre of the Institute of Transport, held in Buenos Aires on August 26, a paper on "Railway Engineering Workshops: their Relation to Railway Operation," by Mr. H. G. Beckwith, A.M.Inst.T., Works Superintendent, Buenos Ayres & Pacific Railway, was discussed. Mr. C. R. S. Harris, Director-General, B.A.G.S. and B.A.W.R., Chairman of the centre, presided, and opened the discussion, in which Messrs. G. C. Bonner (C.A.R.), S. E. Fay and E. A. Richards (B.A.G.S. and B.A.W.R.) took part.

At a meeting of the Buenos Aires branch of the Institution of Railway Signal Engineers, held on September 7, Mr. C. T. T. Comber, A.I.E.E., M.I.R.S.E., Chief Telegraph Assistant, B.A.G.S. and B.A.W.R., read a paper on "Carrier Telephony," illustrated by diagrams and lantern slides. Mr. C. Redman, Branch Chairman, presided.

NEW ZEALAND

Children's Station Nurseries

Following the success of the children's nursery at Wellington station, the Railways Department is making similar provision in the new Christchurch station for which preparatory work has begun. For the twelve months ended July 9, 3,305 children were entrusted at Wellington station to the care of the matron and her staff, or an average of more than 63 children a week, and it is confidently expected that the patronage will increase during the coming year. The highest attendance on any one day was 46 on Christmas Eve. It is generally agreed that this success has been due to the care and attention given to the planning of this amenity. The arrangements made to care for children, from babies a fortnight old to children of eight years, are as complete and attractive as forethought and knowledge could make them.

SPAIN

Andalusian War Route Excursions

It is announced in Burgos that the second of the "war route" excursions will be inaugurated on December 1 next. The excursion as arranged will start from Algeciras, following from that point a circular route through Malaga, Granada, Cordoba, Seville (three days), Jerez, Cadiz, and back to Algeciras, with eventual extensions to Spanish Morocco, and intermediate trips to La Rábida, whence Columbus sailed on his historic voyage. The excursions will be organised by the National Tourist Service, in well-appointed 35-seat buses, accompanied by interpreter-guides. The trip will take eight days, or three days more with the Morocco extension, and accommodation will be reserved at first class hotels. For the convenience of visitors entering Spain at Irun, an express train will run in connection with the Pyrenees—Côte d'Argent service from Paris, and through carriages will convey passengers at reduced fares from the frontier to Cáceres, whence buses will run to Seville to connect with the tours. It is proposed to initiate the service with an excursion every four days, and intending passengers may join either at Algeciras or at Seville. The conditions will be identical with those of the "war route" tours of the North, already running, and the price will be announced in due course, through the usual agencies.

Bonus for Railway Employees

An order published in the Burgos *Boletin Oficial* of September 22, refers to the surcharge collected on all railway tariffs under the Decree of July 29, 1932, for the purpose of paying a bonus to railway employees. The amount now in question is that collected by the companies during the period April-December, 1937, a total of 6,021,820 pesetas, which will be distributed among the 119,278 employees now working in Nationalist territory on a sliding scale, according to grade and rate of pay.

GERMANY

Conditions of Travel to and from Sudetenland

At present the German 60 per cent. reduction is granted only as far as the old frontiers (Bodenbach, Eger, &c.) and *not* for journeys in the Sudetenland itself. Persons resident in the Sudetenland will, until December 1, be permitted to purchase tickets at the 60 per cent. reduced rate, but only for journeys between the old frontiers and a destination, or frontier, within the former German boundaries, *i.e.*, the 60 per cent. reduction will not be granted to any person for journeys in the Sudetenland itself.

The official conversion rate for the Sudetenland has been fixed at 1 Czechoslovakian Crown = 12 pfennigs.

Train Services

There are no through trains from Berlin to Budapest or Vienna *via* Oderberg; trains from the German side *via* Breslau are running as far as Ratibor only. From the direction of Dresden German trains are running to Bodenbach and Eger only, with the exception of a local service to Karlsbad. There is no through service whatsoever to Prague. (See also page 837.)

All Austrian Passports Expire on December 31

Before the end of this year all holders of Austrian passports must apply personally or in writing to the Passtelle der Deutschen Botschaft, 18, Belgrave Square, London, S.W.1 for the issue of new German passports. They are advised to make application before the end of November.

THE FAR EAST

New International Expresses

In THE RAILWAY GAZETTE of September 23 last, mention was made, on page 542, of a new international train service being inaugurated on October 1 between Fusan in Korea and Peiping, *via* Mukden. The daily trains connect with the Fusan—Shimonoseki boat service of the Japanese Government Railways. They run over the Peking—Shanhaikuan section of the Peking—Mukden Railway, now under Japanese control, the Shanhaikuan—Mukden section of the same line, a part of the Manchukuo State Railways, the Mukden—Antung line of the South Manchurian Railway, and the Antung—Fusan line of the Chosen Railways (Korea). The trains, in both directions, connect with the night boat service between Korea and Japan at Fusan. The overall time between Tokyo and Hsinking, twice daily, is now reduced to exactly 2½ days, and that between Tokyo and Peking, once daily to three days. The timings in each direction are as follow :—

8.15		Fusan	22.10 (2nd day)
8.00 (2nd day)		Mukden	23.00 (same day)
23.00	,,	Peiping	7.20

In addition, there are now two expresses each way daily between Fusan and Hsinking, the capital city of Manchukuo. These run to the following timings :—

The Hikari express

18.55		Fusan	11.05 (next day)
21.35 (next day)		Hsinking	8.10

The Nozomi express

7.30		Fusan	22.40 (next day)
11.42 (next day)		Hsinking	18.50

These expresses are in addition to the semi-fast and ordinary trains, and provide a much improved through service from Peiping and Manchuria to Japan, *via* Korea.

U.S.S.R.

New Kazan-Bugulma Railway

The Council of People's Commissars of the Soviet Republic of Tataria has appointed a commission to arrange for initiating the building before the end of the year of a railway from Kazan to Chistopol and Bugulma. The new railway, which will be 216 miles long, will traverse the entire Tatar Republic and link up Kazan with the remote region of Bugulma. The biggest job in the construction of this railway will be the building of a bridge 3,773 ft. long across the Kama River at Chistopol.

New Bridge over the Yenisei River

Pravda reports the recent completion of the new railway bridge across the Yenisei River in Siberia. The new bridge, one of the largest in the Soviet Union, has eight spans and is 3,041 ft. long. Construction was begun in 1936, and it was opened for public traffic on October 20.

BRITISH RAILWAY STATISTICS

"The Railway Gazette" monthly table for July, 1938, as compared with July, 1937, compiled from the Ministry of Transport Statement No. 224

Description	Great Britain*	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.
PASSENGER TRAIN TRAFFIC—					
Number of pass. journeys (ex. season ticket holders)	116,806,522	9,032,302	19,059,557	29,631,039	20,999,457
Increase (+) or decrease (−)	− 8,859,055	− 761,503	− 1,786,425	− 2,922,850	− 832,773
Passenger receipts (excluding season ticket holders)	£8,188,513	£1,166,662	£1,764,601	£2,954,375	£1,666,625
Increase (+) or decrease (−)	+ £31,532	+ £15,379	+ £13,319	+ £1,510	+ £27,793
Season ticket receipts	£781,500	£45,934	£152,426	£210,151	£253,856
Increase (+) or decrease (−)	+ £7,199	− £968	+ £8,387	+ £2,372	− £1,512
Parcels and misc. traffic receipts (excluding parcels post)	£1,120,680	£195,611	£343,102	£422,272	£136,141
Increase (+) or decrease (−)	− £56,413	− £10,928	− £23,096	− £11,851	− £6,630
FREIGHT TRAIN TRAFFIC—					
Freight traffic (tons) (excluding free-hauled)	16,867,310	4,124,271	7,793,955	7,572,418	1,076,051
Increase (+) or decrease (−)	− 3,767,820	− 1,227,966	− 1,555,679	− 1,497,092	− 24,710
Net ton-miles (excluding free-hauled)	996,899,811	186,687,600	336,396,280	400,015,080	46,661,805
Increase (+) or decrease (−)	−174,174,837	− 39,120,727	− 60,139,037	− 68,602,052	− 2,842,857
Average length of haul (miles) (excluding free-hauled)	59·10	45·27	43·16	52·83	43·36
Increase (+) or decrease (−)	+ 2·35	+ 3·08	+ 0·75	+ 1·16	− 1·61
Freight traffic receipts	£5,582,942	£972,000	£1,830,699	£2,261,000	£336,065
Increase (+) or decrease (−)	− £816,651	− £198,700	− £265,920	− £329,000	− £2,323
Receipts per ton-mile	1·344d.	1·25d.	1·31d.	1·36d.	1·73d.
Increase (+) or decrease (−)	+ 0·032d.	+ 0·01d.	+ 0·04d.	+ 0·03d.	+ 0·09d.
Freight train-loads: Average train-load (tons)	115·31	121·79	118·41	112·92	99·97
Increase (+) or decrease (−)	− 7·98	− 11·36	− 8·57	− 7·46	− 0·81
Net ton-miles—					
Per train engine-hour	934·14	994·42	976·08	905·89	759·16
Increase (+) or decrease (−)	− 20·44	− 37·37	− 25·48	− 11·49	− 8·90
Per shunting-hour	817·09	720·01	895·75	865·66	560·44
Per total engine-hour	435·85	417·63	467·09	442·66	322·42
Net ton-miles per route-mile per working day	2,325	2,334	2,484	2,688	1,079
Increase (+) or decrease (−)	− 365	− 434	− 399	− 426	− 27
Wagon-miles. Total	302,532,772	54,755,820	107,583,306	124,039,632	15,862,295
Increase (+) or decrease (−)	− 36,740,004	− 7,586,633	− 12,910,590	− 15,271,774	− 696,898
Percentage of loaded to total	66·66	68·80	68·31	68·10	67·50
Wagons per train. Total	32·53	32·42	33·02	32·48	30·82
Increase (+) or decrease (−)	− 1·12	− 1·69	− 1·13	− 0·92	− 0·77
Loaded	21·69	22·31	21·07	22·12	20·80
Empty	10·84	10·11	11·95	10·36	10·02
Train-miles. Coaching—Per train-hour	15·39	14·39	14·70	14·65	18·27
Per engine-hour	12·15	11·24	11·21	11·07	15·21
Train miles. Freight—Per train-hour	9·57	9·95	9·64	9·44	9·19
Per engine-hour	3·78	3·45	4·00	3·91	3·18
Engine miles. Total	49,818,516	7,726,155	13,876,563	18,394,849	7,067,469
Increase (+) or decrease (−)	− 1,387,609	− 282,533	− 489,307	− 679,744	+ 137,230
Mileage run by engines. Total train-miles—					
Coaching	27,958,641	3,740,624	6,773,021	9,358,470	5,468,753
Freight	9,300,271	1,688,795	3,258,647	3,818,822	514,627
Engine-hours in traffic. Total	4,951,768	845,095	1,490,468	1,895,329	539,531
Increase (+) or decrease (−)	− 313,719	− 57,889	− 100,370	− 139,722	− 9,065
Shunting miles per 100 train-miles—					
Coaching	7·02	6·84	6·48	7·39	7·43
Freight	69·95	84·04	64·76	63·88	91·82

Passenger Traffic Statistics*: *Number of journeys, receipts, and receipts per journey (excluding season ticket holders)—July, 1938

Subject	Great Britain	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.	Cheshire Lines	Liverpool Overhead	L.P.T.B.†	Mersey
Full fares—									
Pass. journeys	31,257,535	719,291	1,055,224	1,536,958	3,036,788	15,509	167,815	23,814,924	86,569
Gross receipts	£1,153,697	£110,970	£184,868	£183,061	£319,529	£3,233	£1,807	£331,600	£1,539
Receipts per pass.	8·86d.	37·03d.	42·05d.	28·59d.	25·25d.	50·03d.	2·58d.	3·34d.	4·27d.
Reduced fares—									
Excursion and week-end									
Pass. journeys	53,153,968	5,641,969	13,080,012	19,606,541	10,651,213	525,808	152,050	1,585,572	777,610
Gross receipts	£5,743,734	£877,969	£1,316,348	£2,377,390	£1,007,828	£52,212	£1,858	£37,235	£13,621
Receipts per pass. journey	25·93d.	37·35d.	24·15d.	29·10d.	22·71d.	23·83d.	2·93d.	5·64d.	4·20d.
Workmen—									
Pass. journeys	25,737,385	1,709,002	3,435,989	6,659,347	5,687,552	249,340	210,622	6,689,084	227,578
Gross receipts	£390,322	£26,818	£58,668	£113,350	£96,228	£4,574	£1,835	£76,081	£2,027
Receipts per pass. journey	3·64d.	3·77d.	4·10d.	4·09d.	4·06d.	4·40d.	2·09d.	2·73d.	2·14d.
Other—									
Pass. journeys	6,494,972	926,948	1,440,762	1,763,035	1,610,250	42,907	46,382	514,001	21,637
Gross receipts	£706,892	£107,014	£158,082	£194,008	£227,592	£4,466	£315	£5,158	£362
Receipts per pass. journey	26·12d.	27·71d.	26·33d.	26·41d.	33·92d.	24·98d.	1·63d.	2·41d.	4·02d.
Total—									
Pass. journeys	116,806,522	9,032,302	19,059,557	29,631,039	20,999,457	834,140	576,869	32,603,581	1,113,402
Gross receipts	£8,188,513	£1,166,662	£1,764,601	£2,954,375	£1,666,625	£65,088	£5,815	£450,074	£17,556
Receipts per pass.	16·82d.	31·00d.	22·22d.	23·93d.	19·05d.	18·73d.	2·42d.	3·31d.	3·78d.

* All standard gauge railways † Includes passengers originating on the railway undertakings, and on the Whitechapel and Bow Joint Railway

SIGNALLING ON THE NETHERLANDS RAILWAYS

Alterations necessitated by electrification

THE electrification of a considerable portion of the Netherlands Railways has necessitated corresponding alterations in the signalling apparatus to prevent interference with its proper working. The block and power signalling equipment has hitherto been worked with earth return, for reasons of economy, but metallic circuits have now been put in. The use of rectified current for the overhead traction wires and the presence of 10,000-volt 3-phase overhead feeders on certain sections such as Amsterdam—Rotterdam, and Amsterdam—Alkmaar, made it necessary to take precautions against the effects of induction.

Considerable lengths of new cable have been laid to accommodate block, telegraph, and telephone circuits, the latter being equipped at intervals with Pupin coils to counteract the capacity effect. These cables have been supplied by the Netherlands Cable Works at Delft between Rotterdam, Gouda, Utrecht, and Arnhem; and between The Hague and Moordrecht junction; those between Amsterdam, Utrecht, and Eindhoven were supplied by Felten & Guilleaume of Cologne. Connection had, of course, to be made with all signal boxes, stations, and intermediate telephone posts through suitable junction boxes. The interiors of the block apparatus, and the telephone commutators, have been altered, while a special breakdown reporting telephone installation, communicating with the control office at Utrecht, has been constructed, comprising 135 substation call points. New automatic telephone exchanges have been constructed at Haarlem, Rotterdam (D.P.), The Hague, and Arnhem and connected to work on a dialling system uniform with those existing at Amsterdam, Alkmaar, Uitgeest, Utrecht, and Amersfoort, which have been modified to suit.

The existing signalling installations at Boxtel, Hertogenbosch, Gouda, Woerden, The Hague, Rotterdam Maas, Voorburg, Geldermalsen, Waardenburg, and Hedel have been altered to meet the higher speeds now being run and other operating requirements.

Certain sections of line were already equipped with automatic block signals and primary battery track circuits, as described in THE RAILWAY GAZETTE for January 1, 1937, and alternating current track circuits with impedance bonds have been substituted. The question of reserve power supply was given special attention, direct connection to the local main supply or the substation traction feed alone being considered undesirable. The arrangement finally adopted was to have a converter set running on the a.c. mains and providing 1,500 volts a.c. for the signal feeders and 140 volts d.c. for charging an accumulator group. If the main supply breaks down the d.c. generator is driven from the accumulators, and the alternator continues to provide the a.c. signalling current. If the converter set is out of order the signalling current can be obtained direct through transformers. Local transformers reduce the main signalling a.c. current from 1,500 to 220 volts.

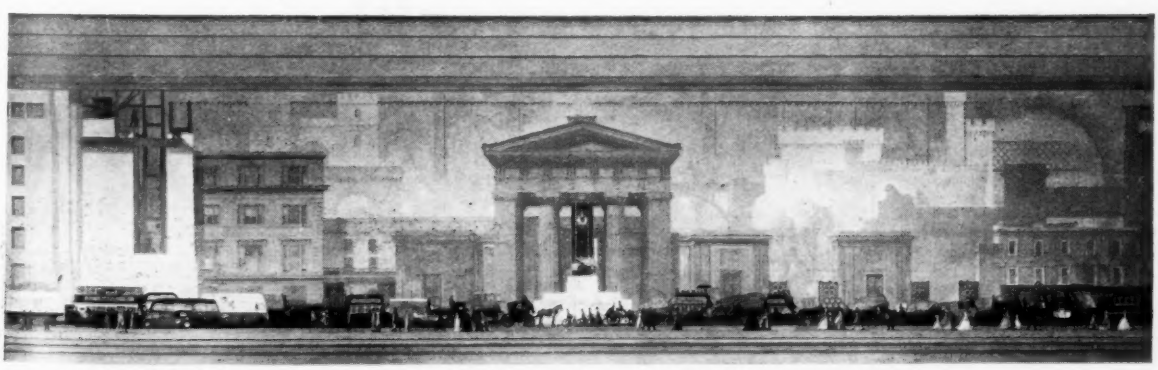
The abolition of earth return in the power signalling installations at Abcoude, Maarssen, Lunetten, Best, Maarn, Maarsbergen, Wolfheze, Hertogenbosch, Utrecht, Eindhoven, and The Hague necessitated a large amount of re-cabling. The short track circuits used for route and point locking were left to work on d.c. with the addition of protective resistances.

Many signals had to be altered owing to the overhead wiring interfering with their visibility. Distant signals have been moved out on all sections where the speed of trains may reach 125 km.p.h. (77¾ m.p.h.), and many new ones installed to repeat the starting signals. The following figures show the work done:—

Number of signal boxes needing alteration to wiring, &c.	140	
Number of signal boxes needing circuits altered	about 3,500	
Insulated rails and points affected	about 250	
Signals affected	852	
Cabled conductors	about 25,500 km.	(15,845 miles)
Telephone connections affected	565	

The foregoing figures relate entirely to the electrified sections and do not cover alterations due to increased speeds on other parts of the system. Hitherto colour-light signals have been used only at isolated places where special circumstances made them advantageous, such as Wychen, Willemsdorp, and on the Blerick and Koningshaven bridges, but an installation of automatic light signals, of the internal spectacle type, has now been made between The Hague and Voorschoten. The normal clear system has been adopted, using the same aspects as are now shown at night by the ordinary semaphores, and there are 25 signal units on 20 posts.

This work has been carried out under the direction of Mr. H. J. Van Aalderen, Chief Signal Engineer of the Netherlands Railways. The above particulars are taken from articles by him in *Spoor- en Tramwegen* for July 5 and August 2 last.



Mural painting entitled "One Hundred Years" in the new L.M.S.R. School of Transport, Derby

EARLY TURNTABLES

Railway turntables used in 1756, 1765, *and* 1842

A BRANCH of early railway development about which comparatively little has been written is the adoption of works railways in connection with extensive engineering undertakings. The fact is on record that quite a number of eminent civil engineers of the eighteenth century used railways for the transport of heavy materials but in very few cases have contemporary descriptions of such lines survived. A notable exception is the case of the Eddystone lighthouse which was built by John Smeaton in the 1750's. Smeaton was a careful recorder and the collated volumes of his reports which were published in 1812 afford many interesting sidelights on early railway practice. It is, however, to his own account of the building of the Eddystone lighthouse that we are indebted for the description of the works railway which he built at Millbay, Plymouth, in connection with the work and incidentally this account is the earliest known to the present writer which describes and illustrates a turntable.

It was in the early months of 1756 that Smeaton adopted the principle of shaping the stones for his Eddystone lighthouse and arranging them on the mainland in exact position for re-erection on the water-swept islet upon which the lighthouse was to be built. It appears that Smeaton actually began drafting an account of this notable work while the undertaking was actually in progress but professional duties prevented him from completing it then. According to his own statement he recommenced the composition of the work during 1784 and the

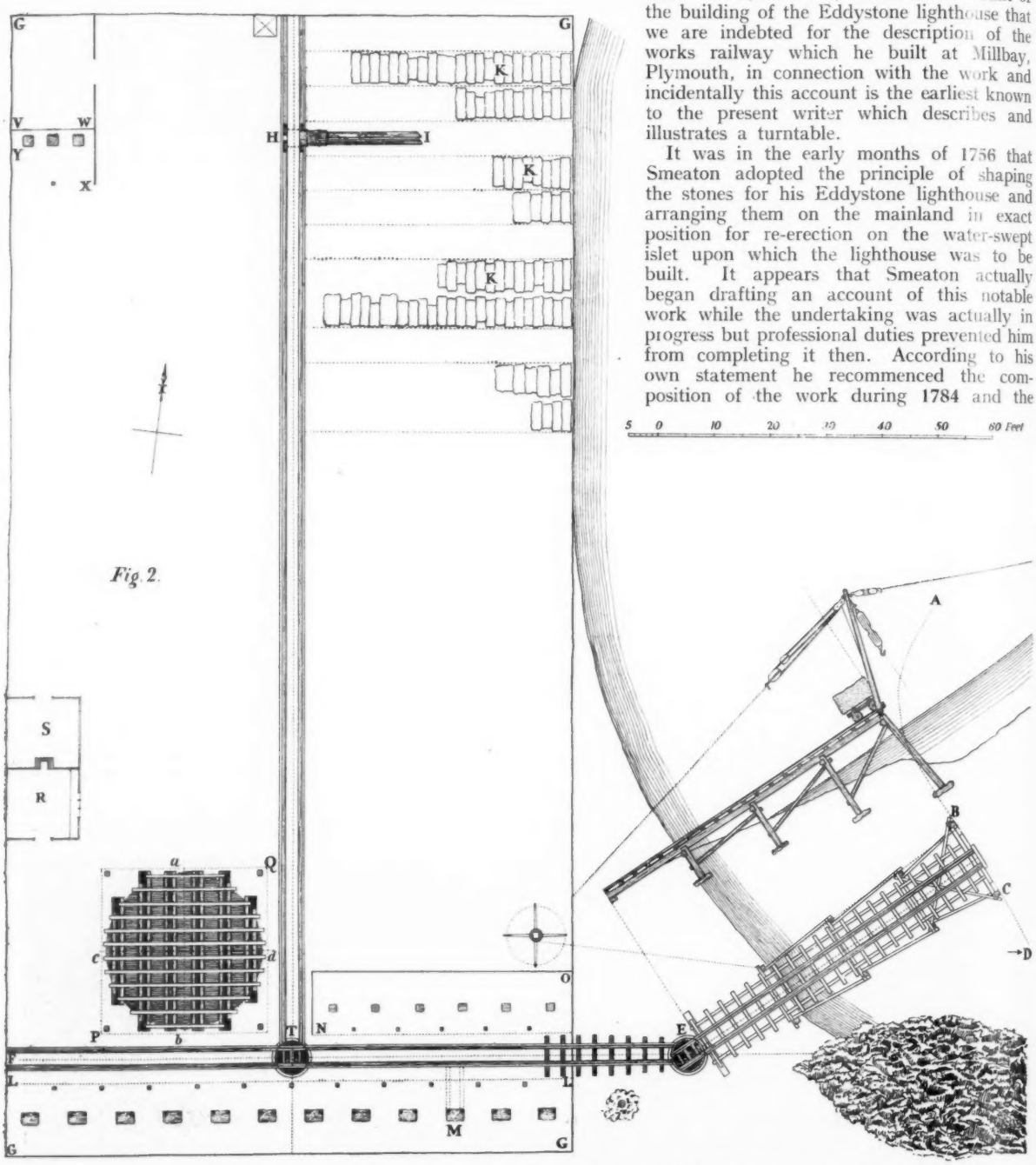


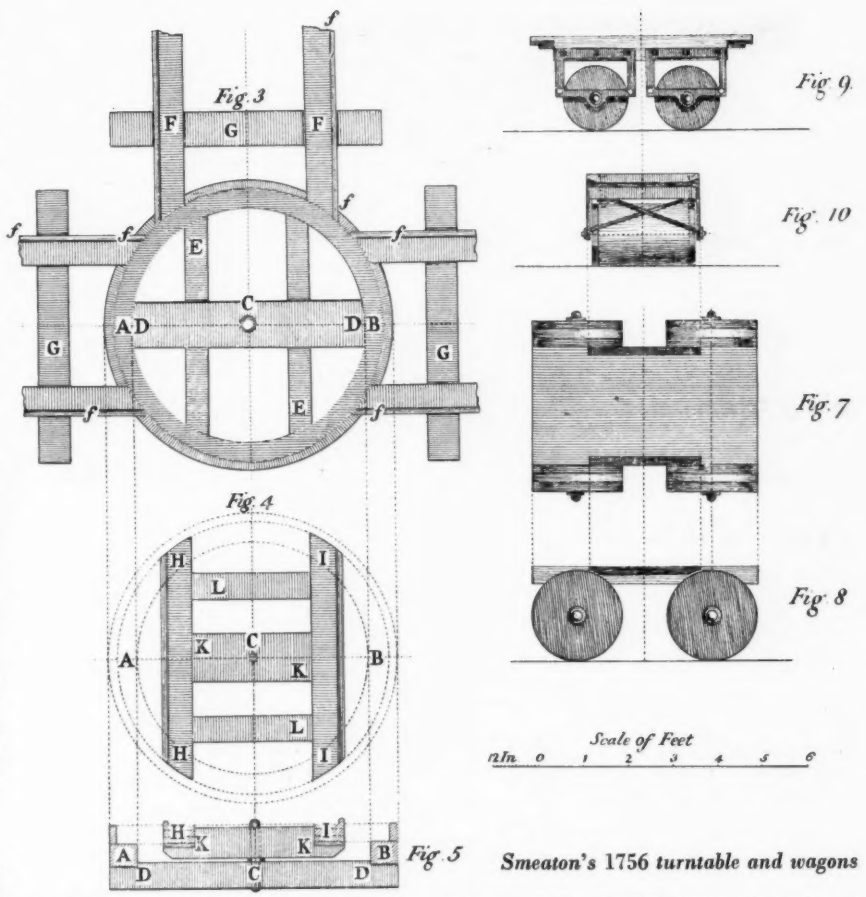
Fig. 2.

PLAN & DESCRIPTION *of the* **WORK YARD** *at* **MILL-BAY** *with its* **FURNITURE & UTENSILS.**

(1756)

finished account was first published in 1791 under the title of "A Narrative of the Building and a Description of the Construction of the *Edystone* Lighthouse with stone" by John Smeaton. In book 3, chapter 3, on page 94, Smeaton says:—

"From a view of plate No. 17, the reader will perceive that a vessel to be unloaded of stone being laid *athwart* the Jetty Head, a pair of *Purchase Blocks* being suspended from the top of the *Shears*, and the tackle *fall* (or running rope) carried to the small *capstand* in the yard; the stones, hoisted sufficiently high, can be delivered upon the four-wheel carriage that runs along the timber road, commonly called at the *Collieries*, where they are used, a *Rail Road*: and being landed upon the carriage, any stone can be delivered upon any of the *Bankers* in the line of the work-sheds on either side: or the carriage being turned a quarter round upon the *Turnpike*, or Turnrail at T, it can be carried along the road that goes up the middle of the yard, and be delivered upon any part of its area destined for their desposition; . . ."



Smeaton's 1756 *turntable and wagons*

The illustration to which Smeaton referred was a full page plate (No. 17) entitled "Plan & Description of the Work Yard at Mill-Bay with its Furniture & Utensils." This bears the imprint "J. Record Sculp. 1788" which in itself gives some idea of the time and care which Smeaton devoted to the composition of his book.

We reproduce Smeaton's own description of the railway, turntable, and other rail equipment as follows:—

"*Fig.* 2. *Plan* of the *Work-yard* and *Jetty*. A B C D is the line terminating the head of the Channel. Now any vessel laying against the two large piles B C, on which a pair of *shears* being erected, can be unloaded of her cargo of stone, and delivered upon a *wheel carriage*; that passing along the jetty to the *turn-rail* E, the carriage is there turned round till it becomes fair with the *rail-road* E F; and passing along it, enters the work-yard, whose boundary is marked G G G G.—At T is another *turn-rail*, which enables the carriage to go on with its burthen; either in the straight line, or to turn there and go along the rail-road in the middle of the yard, and arriving at any destined point, suppose H, it is there met by a *roll-carriage*; for which, planks being temporarily laid, as at I; the burthen (being transferred on small rollers) will be easily moved thereon, to the extremity of the yard sideways; and thus stones can be deposited, as at K K (shewn *edgeways* upward) upon any point of the area of the yard, and returned by the same means.

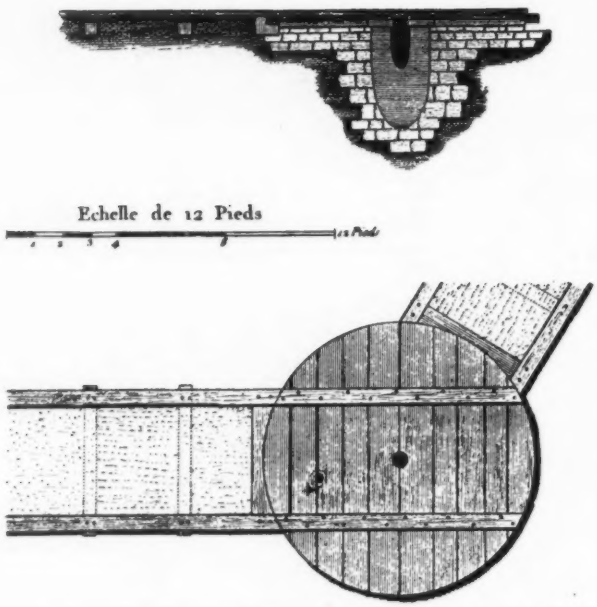
"The area boundered by the line G G, and the dotted line L L, is the *Portland Workshed*. M denotes one of the *bankers;* to which, from the wheel carriage (supposed on the rail-road opposite) *strong joists* being laid, as shewn by the dotted lines, the pieces of stone are brought on *small rolls;* the bankers having *notches* sunk therein, to receive the ends of the joists.—In like manner, the area N O was the shed for the *Moorstone Workers*.

"The square area P Q denotes the extent of a *roof* supported by four posts covering the *Platform*; whereof *a b* represents the *platings* of rough stone walls; *c d* one of its principal *floor timbers*, 6 by 12; these being covered with three-inch *plank*, and brought to a *true level*, made a *stout floor*, upon which the *courses* were *brought together*.—R the *cabin* for the *foreman* of the yard. S a small *store-room* for tools and iron work. G W the *store-shed* for *Watchet lime* and *Puzzolana*. V X the shed for *bucking* or beating the larger parts of the *Puzzolana* upon W Y, the *bank* with three cast *iron beds* upon it.

"*Fig.* 3. Supposed a *detached figure*, being the *ground plan* of the *turn-rail* at T, (*fig.* 2) to an *enlarged scale* wherein A B is a *dormant circle* of wood, well supported; of which C marks the *center pin* fixed in the transverse beam D D: E E being connecting studs. F F are portions of the *rails*, whereon the *wheels* move, which are kept in place by the *fillets f f*, nailed on each side. G G shew the *sleepers* for supporting the rails at about a yard's distance middle and middle; as is also shewn near E in *Fig.* 2.

"*Fig.* 4 is the *Plan* of the moveable *turn-rail*, and *Fig.* 5 the relative *upright*; shewing also the section of the dormant circle. The three last figures having a mutual reference, the same parts are marked with the same letters: and furthermore, in *Fig.* 4 and 5 H, I shew the *rail part* of the turn-rail, correspondent to those parts marked F F, *Fig.* 3 in *width* and *height*. The *rail parts* H, I are strongly framed upon the *cross beam* K K, and connected by the pieces L, L. The whole being poized, with its burthen, upon the pin C, but without absolutely touching the dormant circle A B while turning; for bearing only upon the *flat shoulder* of the pin, it turns easily; but, when it is *bringing on* or *wheeling off*, the *equilibrium* upon the pin being destroyed, the ends H, I are then supported upon the dormant circle, and the wheels will move steady.

"*Fig.* 7 shews the *Plan*, and *Fig.* 8 the *upright* view of the *wheel carriage* to the same scale as that of *Fig.* 3, 4



Wagon-way turntable illustrated by Gabriel Jars in "Voyages Metallurgiques" (1765)

and 5.—Also *Fig.* 9 and *Fig.* 10 give the upright views of the *Roll carriage* in two directions to the same scale; which shew distinctly the manner of supporting the *axis* of the rolls on *iron frames*; and how the iron frames are kept upright by four pair of *cross bars.*"

To the Chairman and Directors of the

Railway Company.

SHEFFIELD, *Jany 1st* 1842.

GENTLEMEN,

I beg to introduce to your notice a very simple Machine, which I have had erected on the Rotherham Station, whereby both Engine and Tender are turned or reversed without disjointing or uncoupling them, thereby effecting a saving of Time, Labour, and wear of Machinery. I will point out a few of the advantages which it possesses, and leave you to make the comparison with what you observe to be the practice on your own line of Railway.

First, then, as to Time, which is a most important matter where quick dispatch is required, one Man and one Boy can reverse the Engine and Tender, with great facility and ease to themselves, in much less than one Minute. A Coach may be reversed in less than Half a Minute. Two Tracks may be turned at once; and, if necessary, one Man alone can turn the Engine and Tender in a Minute.

My arrangements enable me to warrant the Machine to be made firm, substantial, durable, and of the best Materials and Workmanship, being all done under my own immediate inspection; and should you wish to avail yourselves of the above important advantages, I should be most happy to receive your Orders, and to attend to your Commands.

I am, Gentlemen,

Your most obedient humble Servant,

Thos Pearson

HALL CARR TERRACE.

The following Testimonials of its Utility has been kindly given by the Directors of the Sheffield and Rotherham Railway Company, who have now observed its Convenience for Twelve Months, and they state as below:

SHEFFIELD, AUGUST 11th, 1842.

We, the undersigned, being Directors of the Sheffield and Rotherham Railway, do hereby signify our Approval of the Turn Table which has been put down by our Secretary, Mr. Thomas Pearson, at the Rotherham Station, both as to its Utility and the Ease and Facility with which it is worked, and we can confidently recommend it to the Attention of all Managers of Railways as a substantial, efficient, and very useful Adjunct to any Station.

W. VICKERS, CHAIRMAN.
G. W. CHAMBERS, DEPUTY CHAIRMAN.
HENRY BRIGGS.
THOMAS LINLEY.
BENJAMIN VICKERS.
WILLIAM JACKSON.
WILLIAM BRADLEY.
SAMUEL JACKSON.

I have repeatedly observed the Engine and Tender reversed in Forty Seconds.—WILLIAM JACKSON.
I have seen the Table turned round under the Half Minute.—J. WILKINSON.

The Tables are made of various Sizes, from 25 to 30 Feet Diameter, and warranted for general use and regular working for either 1 or 7 Years, but not against violent Collision or Accident, caused by negligence or inattention.

The only important detail not stated here is the gauge of the railway, but the scaled drawings reveal this to have been 3 ft. 10 in. between the inside faces of the fillets *f f*.

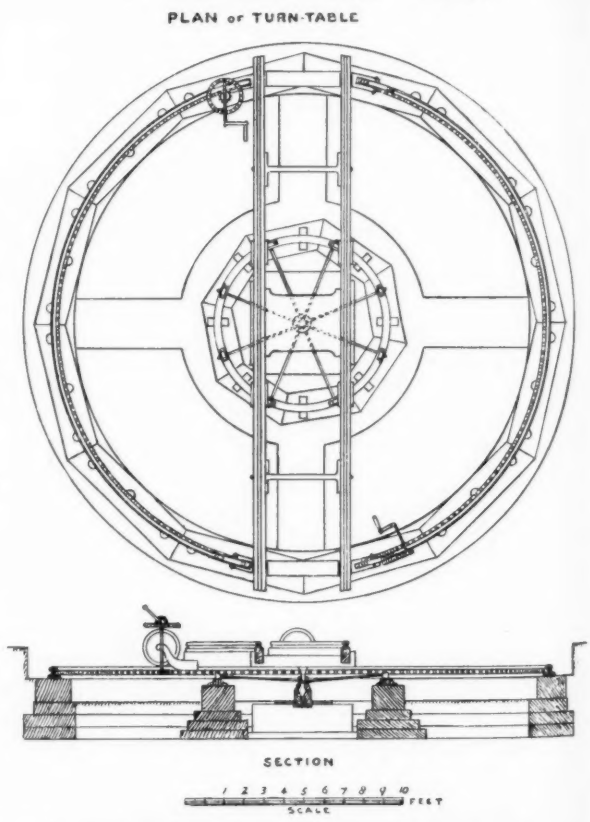
It may be added that Smeaton died on October 28, 1792, at the age of 68. His volume on the "Edystone" lighthouse attracted very considerable interest and in 1793 a second edition with minor emendations was published; the railway references, however, remain unchanged.

In "Voyages Metallurgiques," published in 1765, M. Gabriel Jars, of the Royal Academy of Science at Paris, illustrated a wagon-way turntable for a typical 4-ft. gauge line accommodating flanged-wheeled vehicles.

One of the earliest "modern" designs of turntable owed its origin to the versatility of Thomas Pearson, the first Secretary of the Sheffield & Rotherham Railway—a line which was opened exactly a hundred years ago. In these days of specialisation it would be unusual to find a secretary of the railway preparing a design for a turntable, yet a pattern worked out by Mr. Pearson in conjunction with Isaac Dodds, Consulting Engineer of the railway, was the forerunner of the modern type with smooth circular rail and balanced girder. The original circular which Mr. Pearson had printed to bring the invention to the notice of other railways is reproduced. A personal letter dated September 2, 1842, to a Mr. G. A. Miller, who was evidently contemplating the purchase of such equipment, reads:—

"I inclose you a lithograph plan of the Turn Table (showing the Ashlar & foundation to be furnished by the company) & I furnish all the rest. The outside rim is in Segments of 6 ft. long firmly fitted and bolted together, on which the carrying wheels (2 ft. diar.) run and which is to be

(*Concluded at foot of opposite page*)



Circular prepared by Thomas Pearson, first Secretary of the Sheffield & Rotherham Railway, to introduce his patent turntable

SUPPLYING WATER AT BRANCH LINE TERMINALS

An economical system, utilising "off duty" locomotives, introduced on an Indian railway

PARTICULARS relating to an improved system for replenishing locomotive water supplies at branch line terminals in India have been sent us by Mr. P. N. Batra, District Locomotive Superintendent at Pahartali, Chittagong, Assam-Bengal Railway, who was responsible for working out the details of the scheme. Whilst investigating certain ideas for economy in railway working, Mr. Batra decided that some method might be devised other than the extravagant one of employing four or six hand-pumpers to pump from 5,000 to 10,000 gal. of water into a 1,600 gal. overhead tank, entailing five to ten hours of laborious work every day.

A branch line terminal on the Assam-Bengal Railway equipped with special pumping system

The system now adopted is based on the fact that if the work could be done by the locomotive itself, refilling the water tank would be completed in from a third to a quarter of the time required by the hand-pumping method. A trial was made by taking an ordinary Hayward & Tyler steam pump, having a steam cylinder of 6 in. dia. and water cylinder 5 in. dia., and a stroke of 6 in. Pumps of this description actuated by steam from Lancashire boilers were in use at several stations, but were gradually being replaced by diesel pumping sets, which effected a saving of anything from 75 per cent. to 90 per cent., depending on local conditions. At the time of the investigation the boilers and pumps referred to were being sent to the stores for sale, but it was found more remunerative to cut them up and sell them for scrap than to dispose of them as complete units. A trial of the system in which the locomotive itself was used for actuating the pumps took place while many of them still remained available, and as it turned out successful most of the pumps were returned to service under the new conditions.

The pump is placed at a suitable site near a ground tank or river at a branch line terminal, but as close to the line and the river, or tank, as possible. The suction pipe used is 3 in. dia., and a delivery pipe, 4 in. dia., is led to the overhead tank. From the steampipe connection a lagged steampipe is led away to a place beside the railway line and clear of moving dimensions. From here a length of flexible or ordinary copper pipe with the necessary flanges and coupling nuts is connected to the end of the steam blower pipe of the locomotive, where a two-way cock gives a connection for cleaning boiler tubes by steam. The blower valve is opened gradually on the footplate after the driver has opened the steam pump cock and cylinder cocks and lubricated the pump. The pump then starts working, and if the steam pipe connection and suction head are not excessive the 1,600 gal. tank can be filled in twenty minutes.

The idea is feasible only at branch line terminals where the locomotive has to stop for an hour or more and where water is ordinarily taken. It is pointed out that the running costs are practically nil, as on reaching the terminal there is always 140 lb. per sq. in. left in the locomotive boiler, which otherwise would go to waste. It has been found advisable not to pump at more than 120 lb. per sq. in.

On the Assam-Bengal Railway the time occupied in pumping is entered on the shunting certificate, so as to account for coal, oil, and so on, and the effect of this is to ensure for the enginemen an increase in their monthly pay equal to from one to two days a month. It is intended to adopt this method of pumping at eleven stations on the Assam-Bengal Railway, which will effect a reduction of 42 in the number of hand-pumpers employed. As the average pay for this class of workman is Rs. 16 per month, a saving of Rs. 672 a month, or Rs. 8,064 a year, will be brought about in wages alone. The scheme has been in successful operation at five stations for the past six months. The pump and fittings at the branch line terminals are tended by the shed lighter, and the pump is housed in a lightly built type of shed to afford protection.

Early Turntables—(*concluded from page* 822)

firmly secured to the Ashlar—the interior cog wheel (is) also in segments is bolted to that Rim—the central part has 8 cast Iron wheels fixed in a revolving frame running betwixt two Metal Rings, one fixed on the Ashlar, the other to the Turn Rails (and) works similar to the common small Turn Tables—the centre Pivot has a steeled foot which turns upon a steel boss properly hardened & can be raised or lowered at pleasure by a large Iron Screw on the Centre pin. The handles & gear are seen by inspection. The price for a machine delivered here either on the Canal or railway —if 26 Ft. Dia. is £150 above that size to 30 feet £170— Cash in 3 Mos—guarantee (if required) 5 per cent. per annum on the cost price.

I remain Sir,
Yr. mst. obedt. Servt.
Thos. Pearson

"P.S. Although my Circular names 1 Minute as the time in which 1 Man *turns it* yet by a little extra exertion he can turn it *quite round to the other Line of Rails* in less than half a Minute with 6 wheeled Engine & Tender on."

The manufacture of the turntables was carried out at the Holmes Engine Works of Mr. Isaac Dodds.

SHIPMENT OF LOCOMOTIVES AND ROLLING STOCK BY BELSHIP

A brief history and description of this revolutionary method, saving much time and expense, especially with locomotives, which are landed virtually ready for the road

AN illustrated article in the September 8 issue of our associated contemporary *Shipbuilding and Shipping Record*, contains some interesting details concerning the transport by sea of complete locomotives and rolling stock, often as deck cargo. It is in the carriage of such consignments that the Norwegian Christen Smith fleet of special motor vessels specialises. This fleet, known as the Belships—the names of all the vessels having the prefix "Bel"—has successfully handled nearly 200 shipments of this and similar kinds since 1921. Its formation was due to the foresight of Captain Christen Smith of the Norwegian Navy and an expert in heavy lifting, who in the first instance undertook to deliver to the Belgian State Railways 200 Armstrong-Whitworth heavy 2-8-0 locomotives and tenders urgently needed. Due to the necessity for dismantling, re-erecting, testing, and painting, a delay of four months would have been involved had the usual methods of transport been adopted, whereas these delays were eliminated by Captain Smith's scheme. He had two existing cargo steamers converted to embody his ideas, which entailed special methods of storage, securing, lifting gear, and slings, and the locomotives were successfully shipped and running on Belgian rails within 24 hr. of discharge from the ships.

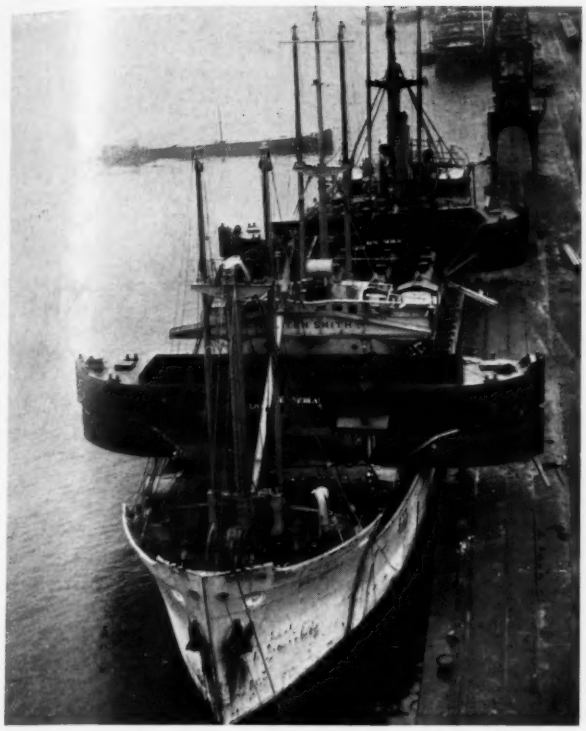
A Belship with a full deck cargo of railway coaches

The Design of the First Belship

Subsequently, he was entrusted with the shipment of locomotives for India, and having gone to Bombay to study discharging conditions there, he decided to have specially-designed and equipped ships built, embodying new ideas in shipbuilding. The result was a diesel-engined ship of 3,400 d.w. tons, 300 ft. in length, 46-ft. beam, and 18 ft. 8 in. loaded draught, having wide holds as clear of bulkheads as strength and classification would permit. Large hatches, up to 47 ft. in length, were introduced with specially strengthened covers to carry locomotives, coaches, or small craft as deck cargo; any loss of strength in the deck due to the large hatches was counteracted by the use of deep hatch coverings.

A long single deck, with engine casing right aft and navigating bridge forward of the main deck, provided ample space for large-unit deck cargo. Specially strong stump masts, heavy derricks, and winches clear of the deck space were required for lifting abnormal loads. The design of the ship ensured great stability to prevent excessive listing when these loads were being shipped or discharged. As discharging facilities at some overseas ports were inadequate, one crane to lift 100-120 tons and another of 45-50 tons capacity were fitted. These heavy lift cranes have long steel tubular derricks, high-tensile steel blocks and pulleys, and large 5-10-ton lifting beams.

Such was the first Belship, the *Beldis*. She was soon followed by the *Belnor* and the *Belray*, with hatches up to 51 ft. long; and the *Belmoira* and the *Belpamela*, 4,500-ton ships with hatches up to 71 ft. All the foregoing are single-screw, but the fleet is completed with two twin-screw ships, *Belpareil* and *Beljeanne*, of 10,200 tons and with three 75-ft. hatches. All vessels are powered by diesel engines of 1,350 h.p. As a typical cargo of a Belship, the following carried by the *Belpareil* to India may be quoted. It consisted of nine locomotives (85 tons each) and 19



Locomotives and barges on the "Belmoira"

tenders (30 tons) on the under deck; three 195-ton hopper barges and a 6-ton launch on the main deck; and two 100-ton tugs and a 50-ton coal barge on the fore deck.

Loading and Discharging Problems

Loading or discharging such heavy loads raises many problems of stability, and involves calculations and drawings to decide the arrangement of the heavy derricks and the ballasting of the vessel. Her crew carries out all such operations, and having long experience, has made the technique of heavy lifts a science.

The writer of the present article was present when the first consignment of standard locomotives was discharged from a Belship at Karachi early in 1929. These consisted of 4-6-2 "XC" passenger, 2-8-2 heavy goods, and 0-8-0 shunting engines and their tenders, for the North Western Railway (India). The extent of the list taking place when such engines are swung out over the side, with complete safety, is remarkable. This revolution in the method of shipping locomotives practically ready for the road to all parts of the world has undoubtedly effected a considerable saving in time and expense, and is recognised as a boon to manufacturers and railways alike. Already the Belships company has safely carried over 1,680 fully erected locomotives, nearly 900 fully erected coaches, about 150 complete craft (including tugs, dredgers, lightships, yachts and barges), and more than 100 heavy steel cylinders for oil refineries. As a general rule, the cranes with which the vessels are equipped will handle lifts up to about 110 ft. in length and 115 tons in weight, but in some cases two can be used together to lift 200 tons. About 22 ft. from the ship's side is the approximate outreach, although this can sometimes be increased in special circumstances.

Lübeck-Büchen Double-Deck Trains

IN THE RAILWAY GAZETTE of July 29, 1938, we published an article dealing with the double-deck streamlined trains of the former Lübeck-Büchen Railway, now incorporated in the German State Railway. In this connection we are advised by Scharfenbergkuppling A.G., of Berlin, that the automatic couplers supplied by the firm for these trains are designed to take electric cable connections, which means that all the connections between the special streamlined tank locomotives and the cars are made entirely automatically, so that any operations performed by hand has been eliminated. The fully-automatic Scharfenberg coupler thus effects automatic coupling of the cars, compressed-air pipes, steam-heating pipes, and electric cables, the protecting covers in front of the electric contacts being lifted automatically. We understand also that the same device is used for the permanent coupling between the twin bodies of these articulated cars. The streamlined tank locomotives specially adapted to work these twin-articulated units have automatic couplers and normally work the trains on the push-and-pull principle, when operating both stopping and non-stopping services. The articulated units provide seating for 42 second and 258 third class passengers within a total tare weight of 71 tons.

It often happens in busy times that two of the articulated units are coupled together, when, to maintain the 40-min. booking for the 39½-mile run between Hamburg and Lübeck, an ordinary 4-6-0 express engine hauls the train. When this happens a special adapter, hung on the coupling hook of the tender is used.

Fully-automatic Scharfenberg coupling on the Lübeck-Büchen streamlined double-deck trains, German State Railway

Several hundred of the electric cars for the Berlin S-Bahn now in course of delivery are equipped with fully-automatic Scharfenberg couplers.

INDUCTIVE A.T.C. APPARATUS IN FRANCE

Trials on the Alsace-Lorraine section of the Eastern Division, French National Railways

IN THE RAILWAY GAZETTE for February 16, 1934, we described the system of intermittent inductive automatic train control for distant signals on the Swiss Federal Railways and standardised by that administration for general adoption, over 370 locomotives being now fitted. This system conveys two indications, "caution" or "clear," to the locomotive, with automatic brake application in the event of the former indication not being acknowledged by the driver. The apparatus has been developed for French operating conditions by the Société Parisienne Métrum and applied to 14 signals and three locomotives on the Alsace-Lorraine lines, to repeat the indications of the three-aspect distant signals generalised there after the war. The signalling is modelled on German principles in Alsace-Lorraine and the present distant signals largely resemble those adopted in recent years by the Reichsbahn and described in THE RAILWAY GAZETTE for November 17, 1933, consisting of a disc and an arm, but the aspects shown by the Alsace-Lorraine signal are slightly different. The purpose is the same, however, namely, to give "caution," "reduced speed" or "proceed" indications, corresponding to the conditions obtaining at the home signal ahead.

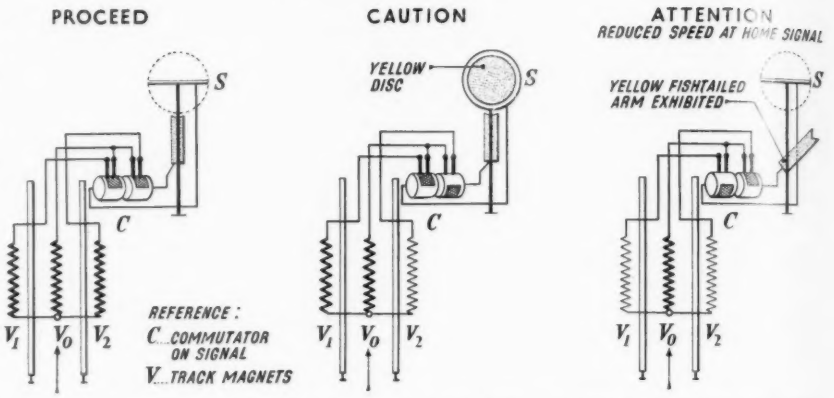


Fig. 2—Diagram of connections for track magnets working with Alsace-Lorraine three-aspect distant signal

Fig. 1—Alsace-Lorraine locomotive equipped with electro-magnets for Métrum A.T.C. system

The Parisienne-Métrum apparatus consists of three inductor magnets carried on the locomotive, as seen in Fig. 1, one in the centre of the four-foot space and the others outside. The former is constantly energised at 24 volts from a train lighting set or turbo-generator. The outside ones act as receivers, either singly or together, to pick up the signal to be conveyed to the cab. On the permanent way, alongside the distant signal, are three similar inductors. The air gap between locomotive and track equipment is about 3 in. but satisfactory working has been obtained with larger gaps. Efficient action takes place until the speed of the train falls to about 2 m.p.h.

In the locomotive cab is a luminous indicator carrying an "in order" pilot light and three lights corresponding to the signal aspects; the receiving relays; and a vigilance push-button, with electrical connections to marking equipment in the speed recorder. There is no source of electric energy at the signal, which is merely equipped with commutators operated by the disc and arm, as seen in Fig. 2, connecting the two outer track inductors in parallel with the centre one, or one of them only, as the case may be.

When the locomotive passes the signal its centre energised inductor produces an impulse in the centre one on the track and hence in one or other or both of the outer ones, inducing in turn similar impulses in the engine receivers and acting suitably on the cab mechanism. Simplifying attachments have not been found necessary.

Audible cab signals are given by a hooter. When a distant signal is at "proceed" this gives a short blast as the track inductors are passed over. If the "reduced speed" or "caution" indication is showing the driver must press his vigilance button before passing the signal. The hooter will sound continuously when the inductors are passed until the button is again pressed. These operations are registered on the paper band of the speed recorder. The correct condition of all parts is thus checked at every "proceed" signal.

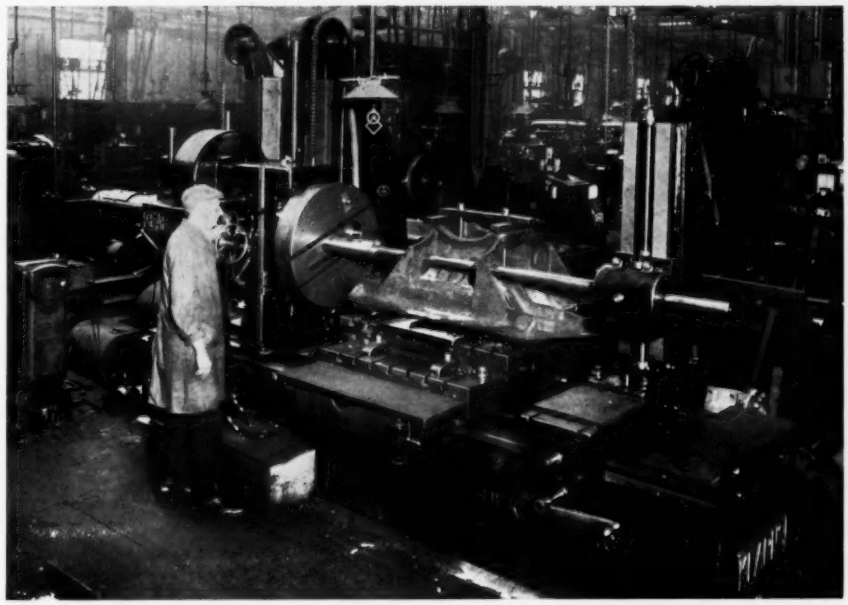
Temporary portable inductors can be used by permanent way staff to produce "caution" indications on passing trains.

MACHINING LOCOMOTIVE DETAILS AT SWINDON WORKS—III

Boring and facing holes in locomotive bogie centres for control spring gear

THE machine tool illustrated* is a Kearns horizontal universal surfacing, boring, and drilling machine, and is seen engaged at Swindon works, G.W.R., in boring and facing the holes for the control spring gear on a cast-steel locomotive bogie truck; numerous other components are dealt with on the same machine, among them being built-up crank webs, valve-gear parts, and brackets.

The machine has a self-contained drive by 15-h.p. electric motor (250 volts, d.c.) through a gearbox giving 24 speeds ranging from 2 to 168 r.p.m. The boring and drilling spindle can be revolved with, or independently of, the facing chuck. Boring and facing can be performed simultaneously. The machine is provided with a rectangular main table measuring 5 ft. 6 in. by 3 ft. 6 in., with cross traverse. This table slides on a saddle which in turn slides on the bed of the machine. A detachable square turntable fitted on the main table can be easily revolved, and clamped in any of its four rectangular positions, this being effected by means of the maker's patented locating and securing mechanism, operated entirely from the front of the machine. This enables the machine to operate on all four sides of a job with only one setting. The clamps, seen in the illustration, are needed only when the machine is set in an angular position. Vernier scales are fitted to the vertical and traverse motions. Rapid power traverse is provided to the vertical motion of the spindle slide, and table motions in each direction.



Horizontal surfacing, boring, and drilling machine

The bed slides are covered by cast iron guards, bedded down to the slides and moving with the tables. The longitudinal screw and shaft are protected in the same way. The machine is fitted with the Kearns dual system of feeds, two ranges with eight speeds each being provided. One range is in cuts per inch and the other in inches per min. A very wide range of feeds can thus be obtained, from extremely fine to very coarse. This particular machine is also fitted with a travelling spindle 5 in. in diameter, but machines of similar capacity can if required be fitted with a 6-in. diameter spindle.

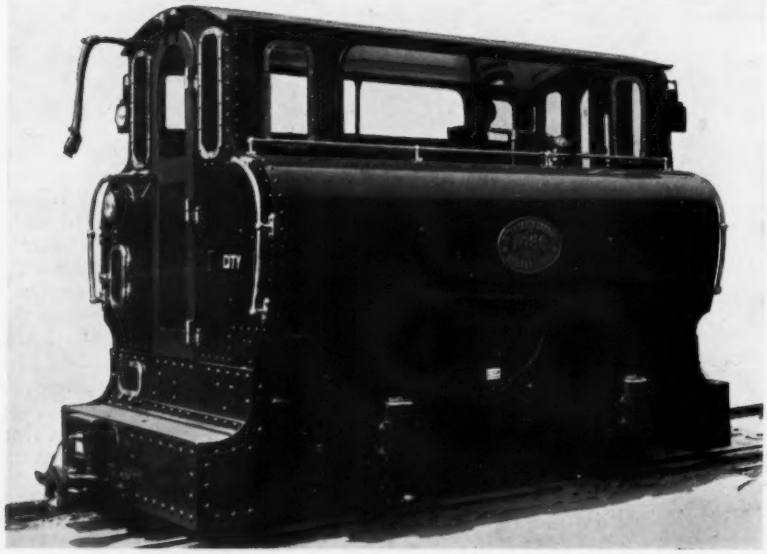
* By courtesy of Mr. C. B. Collett, O.B.E., Chief Mechanical Engineer, Great Western Railway

Bombed Bridge in China

The pictures alongside illustrate the effect of a direct hit from an aeroplane bomb on the side of a bridge pier about 4 ft. below water level. At this point the pier was completely sheared and it will be noticed how the shock has broken the pier above water level along the construction lines. Repairs sufficient to allow the resumption of traffic were effected within 48 hours. Vertical rails were placed round the pier, hooped with 3½-in. angle iron, and the cracks grouted with cement. The pictures are reproduced from snapshots taken from a boat and give the impression that the piers are leaning over. Actually the piers were not deflected from perpendicular

Left: An ingenious and convenient track arrangement for storing mine motors laid out recently by the son of the section foreman of the Louisville & Nashville Railroad for the Blue Diamond Coal Company at Blue Diamond, Kentucky, which is the largest coal mine on the L. & N. Eastern Kentucky Division. This layout accommodates 24 motors; it is constructed of 30-lb. rail laid to the 4-ft. gauge. The storage tracks are entered by means of a switch leading to a three-rail ladder track. Electric point operation has been installed to control all the turn-out points. This depot is now covered by a roof and side walls

Right: Buffer stop end of siding in new goods yard at Surbiton, Southern Railway. Note ample drainage arrangements and neat curbing of old rails facilitating the cleaning of the roadways. A description of the reconstructed station and yard at Surbiton appeared in THE RAILWAY GAZETTE *of May* 13



Left: For nearly two years travellers using Moorgate station on the Metropolitan Line have noticed with interest a brick pedestal in the circulating area upon which was a sheet-covered bulky object. Recently the sheet was removed, revealing the object to be the old City & South London Railway electric locomotive No. 36, *which was built in* 1900 *by Crompton & Co. Ltd., of Chelmsford. It has been freshly painted in the familiar C. & S.L.R. yellow ochre livery. Alongside we reproduce a photograph of No.* 36, *which is one of the two survivors; the other, No.* 1, *is in the Science Museum, South Kensington*

RAILWAY NEWS SECTION

PERSONAL

Sir Ronald W. Matthews, who has succeeded Mr. William Whitelaw as Chairman of the London & North Eastern Railway, has also taken Mr. Whitelaw's place as representative of the L.N.E.R. on the Cheshire Lines Committee.

The late Mr. Alexander Newlands, a former Chief Civil Engineer, L.M.S.R., whose death on August 28 was recorded in our issue of September 2, left personal estate valued at £35,100.

PRESENTATION TO MR. A. E. KIRKUS

At a meeting of the Railway Statistics Committee of the Railway Clearing House on October 21, Mr. A. E. Kirkus, who retired from the position of Director of Statistics, Ministry of Transport, on October 31, was presented on behalf of the committee with an engraved cigarette case. Mr. Kirkus, since the passing of the Railways Act of 1921, acted as the representative of the Ministry of Transport in dealing with the numerous problems which arise from time to time in connection with the statistical returns rendered by the British railway companies to the Ministry. The presentation was made by the Chairman of the committee (Mr. G. Morton, Chief Accountant, L.M.S.R.), who asked Mr. Kirkus to accept the gift as a token of the esteem and regard of the members of the committee and also as a memento of his long and friendly association with them. Mr. Kirkus, in reply, said he had always appreciated the goodwill shown by the companies' representatives in his negotiations with them, and expressed the great pleasure which it afforded him to accept the committee's gift.

L.N.E.R. APPOINTMENTS

The London & North Eastern Railway announces the following appointments:—

Mr. W. Y. Sandeman, Assistant to the Engineer (General), Southern Area, to be Assistant Engineer, Southern Area, in succession to Mr. J. C. L. Train, who has recently been appointed Engineer, Scottish Area (see our issue of October 14).

Mr. J. I. Campbell, District Engineer, Boston, to be Assistant to the Engineer (General), Southern Area, in succession to Mr. Sandeman.

Mr. H. T. Bird, Assistant District Engineer, King's Cross, to be District Engineer, Boston, in succession to Mr. Campbell.

Mr. J. I. Campbell, A.M.Inst.C.E., whose appointment as Assistant to the Engineer (General), Southern Area, London & North Eastern Railway, is announced in the preceding column, began his training as an apprentice with the former Caledonian Railway in the District Engineer's Office, Perth, in 1907. Thereafter he became a junior assistant in the District Engineer's Office, Edinburgh, and early in 1914 entered the Chief Engineer's Office of the North British Railway, as an assistant. During the war he was in the Army from 1914 to 1919, and served overseas in France, latterly holding a commission in the 111th and 260th companies, R.E. On demobilisation, Mr. Campbell returned to the N.B.R. New Works Department, where he remained after the amalgamation and until 1930, when he was appointed Chief Assistant to the District Engineer, Guide Bridge, L.N.E.R. In 1937 Mr. Campbell was appointed District Engineer, Boston, the position he now vacates.

Mr. J. I. Campbell

Appointed Assistant to the Engineer (General), Southern Area, L.N.E.R.

Mr. G. W. V. Shaw has been appointed Assistant Secretary of the Canadian National Railway Company and various subsidiary and allied companies, as from November 1. The position of Assistant Secretary has been vacant since the promotion of Mr. W. H. Hobbs from Assistant Secretary to Secretary of the various Canadian National companies. After experience in chartered accountants' and legal offices, Mr. Shaw entered the service of the Grand Trunk Railway in 1916 in the General Passenger Department at Montreal, and acted as Secretary to the Passenger Traffic Manager and in other capacities until late in 1922. Upon the formation at that time of the Canadian National organisations, he joined the staff of the Chairman and President, the late Sir Henry W. Thornton, and after experience as Assistant Chief Clerk in that office was made Assistant Secretary to the President. When the Board of Trustees took office in 1934, Mr. Shaw was appointed Secretary to the Chairman of Trustees, the Hon. C. P. Fullerton, and on October 1, 1936, was promoted to be Chief Clerk to the Chairman and President, a position which he held until his present appointment. Mr. Shaw, who was born at Berrow, Worcestershire, was placed at the disposal of Mr. Lloyd George for secretarial duties for the duration of his Canadian and U.S.A. tour in 1923.

Mr. G. W. V. Shaw

Appointed Assistant Secretary, Canadian National Railway Company

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We regret to record the death on October 26 of Mr. A. J. Shepherd, a Director of the Costa Rica Railway Co. Ltd. Mr. Shepherd was associated with the late Mr. Frederick Oldershaw Smithers in the early 'eighties in his many interests in companies—chiefly railways—in Argentina and elsewhere, including the Costa Rica Railway Company. Advancing age caused Mr. Smithers to relinquish some of his interests, and in 1893 Mr. Shepherd was appointed Secretary of the Costa Rica company, of which he became Managing Director in July,

1920. He retired from this position in May, 1935, but remained on the board.

Mr. E. M. Bland, C.M.G., late General Manager of the Nigerian Railway, is shortly leaving for Iran in connection with railway development in that country.

Mr. H. E. Parkes has been reappointed a Permanent Member of the Railway Rates Tribunal for a further term of seven years.

As from January 1, 1939, the Permanent Way and the Electrical Departments of the Swiss Federal Railways will be merged into one under the title of Permanent Way and Power Stations Department, in charge of Mr. Hans Eggenberger, who has been at the head of the Electrical Department since 1925.

Mr. Acatos, the present Chief Engineer for Permanent Way, will be retiring at the end of the year.

Mr. N. M. Loubfer, Assistant Chief Mechanical Engineer, South African Government Railways, is on a visit to London with the Hon. O. Pirow, on special duty.

Mr. T. G. D'Alton, Minister for Transport in Tasmania, has resumed his duties on return from a world tour. In all the countries he visited he paid special attention to matters affecting railway work.

We regret to record the death in Buenos Aires on August 27, in his 71st year, of Mr. Philip C. Lynch, formerly Principal Assistant to the General Manager, Central Argentine Railway. Mr. Lynch, who was born in the Province of Buenos Aires in 1867, entered the service of the Central Argentine Railway as a junior clerk in the Accountant's Department. He subsequently served at different times on the Córdoba Central, Córdoba & Rosario, and Córdoba & North-Western Railways. From 1903 to 1908 he was engaged in commercial life, returning to railway work in the latter year as General Manager of the Córdoba & North-Western Railway. When this line was taken over by the National Government, Mr. Lynch returned to the Central Argentine. After occupying the positions of Chief of Movement, and later Commercial Representative in Rosario, he was, in July, 1917, appointed Commercial Superintendent at Buenos Aires. In 1919 he was named Commercial Assistant to the General Manager, and in 1922 was appointed Principal Assistant, occupying this position until the end of June, 1930, when he retired on pension after nearly 45 years' railway service.

PRESENTATION TO MR. W. A. FRASER

On November 1 Mr. W. A. Fraser retired from the post of Engineer (Scotland), L.N.E.R., which he had occupied for the last 27 years, first as Engineer to the old North British Company and latterly as Engineer (Scotland) to the London & North Eastern Railway Company. He came to the New Works Department of the old North British Company 35 years ago and shortly afterwards was appointed District Engineer at Thornton, returning again to the Head Office as Engineer in 1911, when Mr. C. J. Brown was appointed Engineer to the old Great Northern Railway Company at King's Cross. Further details of Mr. Fraser's career were given in our issue of October 28 when recording his retirement. On the day of his retirement, before a gathering of the staff numbering about 120 with Mr. R. C. Rattray, District Engineer, Glasgow, as Chairman, Mr. J. I. G. Macgregor, Assistant Engineer, Scottish Area, on behalf of the staff, presented Mr. and Mrs. Fraser with a handsome bookcase and standard lamp. Mr. Fraser suitably replied to the presentation, and the district engineers added their appreciation of his qualities and abilities.

On November 7, Mr. Fraser was entertained by the chief officers of the Scottish Area to luncheon in the North British Station Hotel, Edinburgh, when he was presented with a handsome lounge suite. The gathering was large and representative both of active and retired officers of the Scottish Area, and Mr. Mills, Divisional General Manager, Scotland, occupied the chair. In making the presentation Mr. Mills expressed regret that the time had come for Mr. Fraser to sever his connection with the company and wished him every happiness and good health in his retirement. He referred to the exceptionally long period of 27 years during which Mr. Fraser had been a chief officer with the North British, London & North Eastern and Forth Bridge Railway Companies, and mentioned many of the more important schemes he had carried out during his term of office. These included practically every type of dock, engineering, and signalling work and constituted a record of which he might well be proud. Mr. Fraser thanked Mr. Mills for his kind congratulations and good wishes, and complimentary remarks were added by Messrs. Calder, Heywood, Maitland, Parker, Chalmers, and Dr. Gunn.

We reproduce a more recent portrait of Mr. Fraser than that which accompanied our biographical notice in the issue above mentioned.

Photo [*Lafayette*

Mr. W. A. Fraser

Engineer (Scotland), L.N.E.R., 1926-38

We regret to learn of the brutal murder in Shanghai of the 78-year-old veteran Chinese statesman, Mr. Tong Shao-yi, who, in 1904, was appointed Director-General of the Shanghai—Nanking and Lu—Han Railways. In 1873 the Manchu Government sent him to study at American universities for seven years, and he afterwards held numerous important Government appointments, such as Vice-President of the Board of Foreign Affairs (1905), first Governor of Fengtien (1907), President of the Board of Communications (1911), and first Prime Minister of the newly-formed Republic. Later he was High Adviser to the National Government before he retired. In 1900 he had been prominent in the suppression of the Boxer movement.

Under the reorganisation scheme of the Netherlands Railways Administration recorded in our issue of September 30, it has now been announced that Professor Goudriaan, Chief General Manager, will be concerned primarily with financial and economic matters; Mr. W. Hupkes, General Manager (Engineering), will be responsible for the Civil and Mechanical Engineering Departments; and Mr. W. F. H. van Rijckevorsel, General Manager (Operating), will take charge of the Operating and Traffic (Commercial) Departments. Mr. Wansink will become General

Secretary, enlarging his present secretarial duties to embrace staff, legal, and certain commercial matters.

Mr. J. D. Evers, who has been Chief of the Operating Department, will retire on May 1 next year.

Mr. E. H. Minjon, Chief Accountant, will retire on December 1, and Dr. J. E. C. Schook, Chief Auditor, will then take over the whole of the Accounts Department.

Mr. M. F. Leamy, Superintendent of the Susquehanna Division, Delaware & Hudson Railroad, retired on November 1, after 49 years of service, and was succeeded by Mr. William Wallace.

Engineer Atanasio Iturbe, Chairman, Local Board, Central Argentine Railway, returned to Buenos Aires on October 18, after a combined business and pleasure trip to Europe.

Major Oscar Loewenthal, General Manager, Buenos Ayres Great Southern and Western Railways, also returned to Buenos Aires on the same date.

Mr. F. O. Cartwright, Managing Director, Buenos Aires Central Railway, sailed for England on a business trip on October 21.

Indian Railway Staff Changes

Mr. T. C. Hales, V.D., on return from leave has been appointed Divisional Superintendent, Rawalpindi, N.W.R.

Mr. L. N. Flatt, V.D., on return from leave has resumed his duties as Chief Mechanical Engineer, N.W.R.

Mr. B. L. Cameron, on return from leave, has been appointed Deputy General Manager, Personnel, N.W.R.

Mr. S. E. L. West, O.B.E., has been appointed Director of Traffic, Railway Board. This change takes place on the return from leave of Mr. F. R. Hawkes, O.B.E., V.D., Chief Commercial Manager, N.W.R., for whom Mr. West has been officiating.

Lt.-Colonel H. H. E. Gossett, M.C., R.E., has been promoted to be a Deputy Chief Engineer in a provisionally permanent capacity, State Railways.

Mr. R. W. Taylor, Officiating Chief Engineer, E.B.R., has been granted 3½ months' leave as from October 14.

The late Sir Basil Mott, C.B., M.Inst.C.E., whose death on September 7 was recorded in our issue of September 9, left estate valued at £43,959 (£36,469 net).

Senator Fourie has been appointed Minister for Railways and Harbours in the South African Cabinet, relieving Mr. O. Pirow of his duties in that connection in order that the latter may have more time to devote to his new responsibilities as Defence Minister.

From *The London Gazette* of November 8: Regular Army Reserve of Officers, Royal Engineers: Major A. S. Quartermaine, M.C., having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers on November 9.

L.M.S.R. Appointments

The following appointments have been approved by the directors:—

Mr. A. C. F. Calladine, Assistant Operating Manager, Glasgow, to be Assistant (Passenger Services) Chief Operating Manager's Office, Euston.

Mr. R. F. Harvey, Assistant to Superintendent of Motive Power, Euston, to be Assistant Operating Manager, Glasgow.

Mr. J. McCreadie, Divisional Controller, Operating Manager's Office, Glasgow, to be Assistant Operating Manager (Traffic), Glasgow.

Mr. G. S. Hussey, Assistant (Job Analysis), Labour & Establishment Office, Euston, to be Assistant, Outdoor Superintendent (New Works), Chief Operating Manager's Office, Euston.

Mr. L. B. Shoppee, Signalling Assistant, Chief Operating Manager's Office, Euston, to be Assistant Outdoor Superintendent (Signalling), Chief Operating Manager's Office, Euston.

Mr. T. Tandy, District Locomotive Superintendent, Saltley, to be Assistant to Superintendent of Motive Power, Euston.

Mr. O. T. Tewson, Solicitor Assistant (Conveyancing), Manchester, to be Assistant Divisional Solicitor, Manchester.

Mr. R. L. Millward, Assistant Divisional Controller (Freight Services), Office of Divisional Superintendent of Operation, Crewe, to be Divisional Controller (Passenger Services), Office of Divisional Superintendent of Operation, Manchester.

Mr. G. R. Parker, District Controller, Warrington, to be Assistant Divisional Controller (Freight Services), Office of Divisional Superintendent of Operation, Crewe.

Mr. R. Paterson, Goods Agent, Nottingham, to be Assistant District Goods and Passenger Manager, Northampton.

Mr. T. P. Bennett, Head Office Inspector (Shunting Analysis Committee), Office of Divisional Superintendent of Operation, Crewe, to be Operating Assistant to District Goods and Passenger Manager, Swansea (located at Abergavenny).

Mr. S. N. Martin, Assistant District Controller, Heaton Norris, to be District Controller, Warrington.

Mr. R. White, Assistant to Divisional Superintendent of Motive Power, Glasgow, to be District Locomotive Superintendent, Saltley.

Mr. W. Ellis, Passenger Agent, Preston, to be Joint Parcels Agent, Manchester (Victoria, Exchange, London Road, Central, John Dalton Street, and Moseley Street town offices, L.M.S.R., L.N.E.R., and G.W.R.).

Mr. H. Bassett, Goods Agent, Stoke, to be Goods Agent, Nottingham.

Mr. L. Orr, Goods Agent, Accrington, to be Goods Agent, Blackburn.

Mr. F. Grundy, Clerk (Research Section), Chief Commercial Manager's Office, Euston, to be Goods Agent, Accrington.

Mr. F. J. Kiddy, Goods Agent, Camp Hill, to be Goods Agent, Rugby.

Mr. W. K. Kerr, District Traffic Agent, Falkirk, to be Goods Agent, Stirling.

Mr. J. W. B. Rayner, Stationmaster, Accrington, to be Passenger Agent, Manchester (Victoria); also in charge of Exchange booking office and Piccadilly town office booking office.

Mr. W. M. Matthews, Chief Parcels Clerk, Leicester, to be Passenger Agent, Preston.

Mr. E. A. Shervington, Chief Booking and Parcel Clerk, Huddersfield, to be Passenger Agent, Wigan (A); also in charge of Wigan (Wallgate).

Mr. J. Armitage, Stationmaster and Yardmaster, Royton Junction, to be Stationmaster, Mirfield.

Mr. W. Papworth, Stationmaster and Goods Agent, Royton, to be Stationmaster and Yardmaster, Royton Junction.

Mr. A. H. Burrow, Stationmaster, Uttoxeter, to be Stationmaster and Goods Agent, Uttoxeter.

Mr. J. H. Unsworth, Stationmaster, Oldham (Mumps, Central and Glodwick Road) to be Stationmaster, Accrington.

Mr. R. S. Wilkinson, Stationmaster and Goods Agent, Heywood, to be Stationmaster, Oldham (Mumps, Central and Glodwick Road).

Mr. A. D. Cochran, Assistant District Controller, Preston, to be Assistant District Controller, Heaton Norris.

Mr. A. E. S. Bayley, Assistant District Controller, Rugby, to be Assistant District Controller, Birmingham.

Mr. F. J. Austin to be Veterinary Surgeon, Chief Operating Manager's Office, Euston, located at Camden.

Mr. O. C. Johnson, District Foreman, Carriage and Wagon Department, Ordsall Lane, to be District Foreman, Carriage and Wagon Department, Manchester (Victoria).

Mr. Ashton Davies, Acting Vice-President, L.M.S.R., who, we are sorry to learn, is suffering from typhoid fever, was reported yesterday to be progressing as well as can be expected.

South African Staff Changes

Mr. J. A. C. Jones, Chief Accountant, has been appointed Controller of Disbursements and Financial Adviser, General Manager's office, headquarters.

Mr. C. M. Hoffe, Assistant Chief Accountant, has been appointed Chief Accountant, Johannesburg.

Mr. James Williams, Expenditure Accountant, Chief Accountant's office, has been appointed Assistant Chief Accountant, Johannesburg.

The Middle Way: Some Reflections on Social and Economic Problems

(*See editorial note on page* 807)

Viscount Horne, Chairman of the Great Western Railway, presided on October 13 at the opening meeting of the 1938-39 session of the G.W.R. (London) Lecture and Debating Society, at which Mr. Harold Macmillan, M.P., a Director of the G.W.R., gave an address on the above subject.

Mr. Macmillan said that recent events in the international sphere had brought into prominence the consideration that the free and democratic systems of government had to show that they could provide a better and freer life than the other systems. The controlled economic systems had a greater power of direction, and the task with which the comparatively free systems were faced was that of acquiring a similar degree of ability to control the national economy so as to increase national welfare and yet retain the old individual freedom. On the human side we were confronted with the facts of poverty, unemployment, and malnutrition; on the economic, with inability to use capital and labour resources, to control the trade cycle, and with wasteful competition.

The necessity for a new economic policy had arisen from new conditions of industry which had invalidated classical economic theory. This theory, that production was so sensitive that it automatically followed variations in demand if it were left alone, did not now correspond to facts. The elasticity of the earlier conditions of production in regard to both capital and labour had gone. Today the capital invested in plant had grown much greater in proportion to wages costs, with the result that in a depression firms did not go out of business nor did capital diminish to the extent that the restoration of equilibrium required.

A similar rigidity had developed on the side of labour. Wage regulations, trade unions, and so on, had destroyed the old adjustment of the price of labour through the free market. It was clear that the competitive conditions of *laissez faire* economy had gone for good. The problem was to devise a new policy for the new conditions, and the solution lay in some kind of planning.

Mr. Macmillan had made an investigation into the total production of the country in order to discover what proportions operated under the different categories of control. It showed the surprising extent to which national, municipal, and various forms of public utility ownership and control had already been adopted. When account was taken also of trusts, combines and the discipline exercised over production by producers' associations it was probably true to say that not more than 20 per cent. of our production could properly be described as free enterprise. Our economy was therefore a mixed one of free and controlled enterprise. The conclusion to be drawn was that there was a field for the monopolies, such as water supply, and a field for new, developing and expanding enterprise in which the *entrepreneur* was a pioneer. At a later stage of these new industries the free competitive conditions were no longer calculated to secure efficiency and the question arose what form regulation should take. Parliament was not an adequate instrument and some kind of industrial self-regulation would be much better.

There were also industries in which some public control was desirable for technical and social reasons. A policy which recognised these categories of control and of industrial fields of effectiveness would avoid the evils of both *laissez faire* and rigid control.

On the monetary side the problem was one of ensuring purchasing power sufficient to absorb products. If the gap between costs and purchasing power was to be closed it was necessary that savings, that part of purchasing power which the individual withheld, should find its way into industry. The rate of saving must not exceed the rate of investment. But most saving was made by the individual for security whereas new capital investment involved risk. The solution to this problem lay in the direction of investment by a board, employing a technique of the kind used when loans were under-written by the Government.

The distributive trades could not be omitted from the general policy. Here again the proper field for controlled distribution was essential foodstuffs which had to be distributed cheaply on a mass basis, whereas free enterprise should deal with commodities which gave a wider consumer's choice. Industrial and financial reorganisation along these lines would give this country the power to withstand the economic pressure which those countries having complete economic control could bring to bear, and yet retain freedom and liberty.

Railways Athletic Association Annual Dinner

A record attendance of some 170 members and guests was present at the ninth annual dinner of the Railways Athletic Association, held on November 4 at the Euston Staff Dining Club, under the chairmanship of Lord Stamp, who is President of the association. Those present included :—

Mr. A. F. Bound, L.M.S.R.; Mr. T. E. Brain, Southern Railway; Mr. H. S. Chapman, L.P.T.B.; Mr. C. T. Cox, G.W.R.; Mr. A. L. Crewe and Mr. H. H. Halliday, L.N.E.R.; Mr. J. F. Lean, G.W.R.; Mr. S. J. Marchant, L.M.S.R.; Major R. F. Morkill, L.P.T.B.; Mr. H. V. Mosley, L.M.S.R.; Mr. W. Geo. Pape, Southern Railway; Mr. R. H. Pitts, L.P.T.B.; Mr. E. A. Richards, Southern Railway; and Mr. E. Uzzell, Southern Railway.

Lord Stamp, proposing the toast of "The Association," remarked upon the record attendance and congratulated the R.A.A. on the strength of its various sections, the combination of which did not interfere with individual freedom of action. He referred humorously to his own early experiences in the realm of athletics, and urged those present to take part in such activities as long as ever they could. He assured them that he would always be pleased to do whatever was in his power to further the interests of sport.

Mr. W. Geo. Pape, in replying, emphasised that the R.A.A. had been lucky in its choice of presidents. Sir Herbert Walker had always been very helpful and had done much to place the association in its present high position. Lord Stamp was similarly desirous of doing everything he could in helping to keep the association on its feet. The association's activities had done so much to bring the railwaymen together that, in their work also, they now were very close together. He voiced the thanks of the members to the President and Vice-President for their support and to the hard-working Secretary, Mr. Holdaway, and the sectional secretaries for their untiring efforts from the early days of the London Athletic Association to the present eleven-year-old Railways Athletic Association.

Mr. A. F. Bound, proposing the toast of "The Chairman," described Lord Stamp as a human dynamo, continually radiating energy and generally working under peak load.

Lord Stamp, responding, remarked that he felt that he had attained to the position of their President without preliminary athletic training and indeed "at a bound." During the evening the Chairman presented the prizes and trophies won in the previous year. The atmosphere of the gathering was as social and pleasant as ever, and was further enlivened by a musical programme.

LECTURES ON TROPICAL HYGIENE.—For the benefit of laymen proceeding to the tropics, the London School of Hygiene and Tropical Medicine has arranged a course of lectures and demonstrations to be given at the school, Keppel Street, Gower Street, W.C.1, from 4 to 5 p.m. on the following dates: November 28, 29, and 30, December 1, 2, 5, 6, 7, 8, and 9. The fee for the course is one guinea, payable in advance to the Secretary at the school, to whom application for admission should be made. A course for engineers and others on the prevention of malaria, lasting one week only, is held at the end of June each year.

STAFF AND LABOUR MATTERS

Railway Wages

The general managers of the four main-line railway companies on Tuesday last, November 8, met the representatives of the three railway unions in reference to the programmes for increases of pay and improvement of conditions of service which have been put forward by the unions and are down for discussion by the Railway Staff National Council next week. The general managers drew the attention of the unions to the revenue position of the railway companies as indicated in the weekly published returns. They pointed out that the decline in gross revenue of the four companies amounted to £5 million for the 43 weeks of the present year. There was nothing in recent figures to indicate any material slackening in the rate of decrease, still less any tendency to replace the fall in revenues by an increase. They indicated that at the same time the companies had had to meet increased expenditure on wages and materials. The prospects were that the diminution in net revenue would be even more marked than in gross revenue, and no noticeable change in this direction could be expected during the remainder of the year.

In view of the foregoing, the companies have felt bound to review their position with the utmost care. They did not wish to act hastily in the matter or upon partial estimates. The complete figures for 1938 would be available early in the year 1939, and if those complete figures were no more favourable than those now anticipated, it would be necessary for the main-line companies to make application for some relief in regard to labour costs. Although no immediate action was contemplated, the companies thought it proper, in order to avoid misunderstanding at a later date, to advise the unions fully of the position. The unions noted the statement put before them by the companies, and intimated that they would consider the position.

Railway Shopmen

The Industrial Court met in London on November 4 to determine the claim of A. R. Pugh, employed by the Great Western Railway Company as painter, Grade II, in the Civil Engineering Department at Shrewsbury, for regrading as painter, Grade I. An agreed statement as to the nature of the work performed by Pugh for two periods of six months each, one in 1936 and one in 1937, was submitted to the court. It was also stated by the National Union of Railwaymen that Pugh for the greater part of his time is acting as chargeman painter, and in this capacity is required to undertake the mixing and matching of colours for the work in hand.

Having regard to the evidence submitted, it was contended by the union that Pugh, having served an apprenticeship to the trade and in the course of his 27 years with the company gained further experience in the various branches of the trade, and being a qualified signwriter, grainer, and paperhanger and fully capable of and required to do such work as mixing colours, matching colours, and, in general, work of highest class finish, is entitled to be graded as a painter, Grade I. The company in opposing the claim contended that the proportion of the work performed by Pugh which could be regarded as being of the highest class and proper to be done by a painter, Grade I, was very small, and that much of his work is properly that of a painter, Grade II, or painter, Grade III. Reference was made to certain awards by the court in regard to the classification of painters which it was suggested made it clear that the grading of a painter must be determined largely by the nature of the work he is called upon from time to time to do and not on his ability to perform on occasion work of a character which if constantly performed might entitle him to a grading higher than that appropriate to the general nature of his work. Accordingly it was submitted that Pugh's present grading as a painter, Grade II, is appropriate to his work as a whole and should not be disturbed. The court by award No. 1,715 finds that the claim of A. R. Pugh to be graded as a painter, Grade I, has been substantiated and awards accordingly.

The Motherwell Accident, L.M.S.R.

An inquiry was held before Sheriff Brown at Hamilton, Scotland, on October 27, 1938, into the circumstances of the double collision which occurred at Wishaw South, and Motherwell, L.M.S.R., on August 4, resulting in the death of a guard, A. Gillespie. The jury found that the cause of death was accidental. A freight train got out of control on approaching Wishaw South, and, overrunning signals, collided with the rear of a passenger train due to leave for Glasgow Central. The fireman was not on the engine of the latter train and the driver was thrown off it by the impact, which separated the engine from its carriages and caused it to start away, the driver having already tried to get on the move when he heard the runaway freight train was approaching.

There is a down grade from Wishaw towards Motherwell, on which the engine attained a high speed and overtook a passenger train which had just left the latter station. Fortunately this train was moving at a fair speed, and the impact was reduced in consequence. The rear guard's compartment was, however, seriously damaged, the guard being flung out on the line and dying soon after. Signalmen and other witnesses, including members of the public, gave evidence concerning the movements of the runaway train and locomotive, but the driver of the former, warned by the Sheriff of the gravity of the case, elected not to do so.

QUESTIONS IN PARLIAMENT

Air Booking at Railway Agencies

Mr. A. M. Lyons (East Leicester—C.), on November 1, asked the Secretary of State for Air whether the ban on advance booking in railway agencies had been now entirely removed from all air services.

Captain H. H. Balfour (Under-Secretary of State for Air) replied: Booking facilities at railway agencies are now available for all existing air services with the exception of those between this country and Eire. The question of booking facilities for the latter services is closely bound up with the general question of future air communications between Great Britain and Eire, on which negotiations are at present proceeding satisfactorily between the parties concerned and will, I hope, result in the removal of this last restriction in the not distant future.

Summer Time

Captain L. F. Plugge (Chatham—C.), on November 4, asked the Home Secretary for what reason summer time started two weeks later in England than in France; and whether, in view of the inconvenience caused in the disorganisation of rail and air schedules and in other directions, he would suggest to the French Government that in future summer time should start simultaneously in both countries.

Sir Samuel Hoare (Home Secretary) wrote in reply: I understand that this matter was recently discussed at a railway timetable conference at Budapest, and as a result it is hoped that arrangements may be made next year to begin summer time in France on the same date as that fixed for this country by the Summer Time Act, 1925.

MAIL CARRIAGE POSITION IN U.S.A. TRAINS.—The U.S.A. Railway Mail Service has drafted a new postal regulation which requires that henceforth "when practicable, one or more cars shall be operated between the engine and the railway post office car." It is understood that the purpose of the new regulation is to ensure smoother riding. Sudden jerks sometimes make clerks sorting letters throw them into the wrong receptacle.

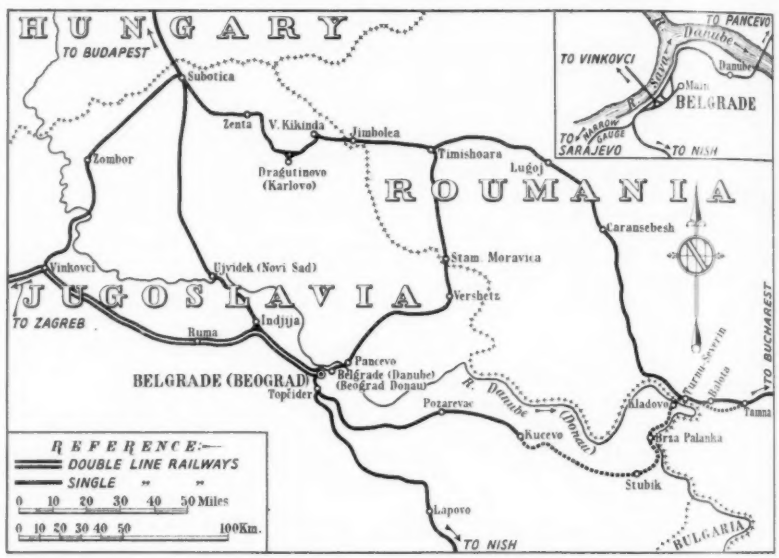
The Simplon-Orient Route to Bucharest

The route of the Simplon-Orient Express between the English Channel and Paris and the Near East will, as was announced in THE RAILWAY GAZETTE of August 12, page 308, shortly be modified in so far as the Bucharest section is concerned. At the moment this portion of the train is detached in the eastbound direction, and attached in the reverse direction, at Vinkovci, 98 miles west of Belgrade on the main line from Zagreb. Thence the route of the Bucharest portion is north-eastward to Subotica, where it crosses the Belgrade—Budapest main line close to the Hungarian border, and on, eastwards, roughly parallel to the frontier, through Zenta, eventually passing out of Jugoslav territory into Roumania at Jimbolea and so onwards to Bucharest *via* Timishoara and Turnu Severin. The rest of the train runs from Vinkovci *via* Belgrade to Nish where the Istanbul and Athens portions separate.

The route which it is announced the Bucharest portion will follow at the end of the year is *via* Belgrade main station, thence by way of the port and harbour lines to the Danube (Donau) station, over the new Danube bridge, and onwards through Pancevo, Vershetz, and the Jugoslav-Roumanian frontier town of Stam Moravica to join the former route at Timishoara. As a through route from the west, this alternative is 18 or 19 miles longer than that *via* Subotica, and the bad connection between the two Belgrade stations is a further disadvantage. A tunnel to give direct communication between them is contemplated, but is unlikely to be completed for several years to come at the earliest.

For passengers between Belgrade and Bucharest, the route *via* Vershetz and Timishoara is no fewer than 115 miles shorter than *via* Subotica, but at present only slow trains are available either to Timishoara or to Subotica, with changes at those junctions. The service between the two capitals will thus be considerably improved by the diversion of the Bucharest portion of the Simplon—Orient Express. The Vershetz line must, however, first be relaid with heavier rails. Eventually a new direct route is to be brought into use from Belgrade to Turnu Severin *via* the existing branch line to Kucevo, whence an extension is to be built through Stubik to the frontier on the right bank of the Danube opposite Turnu Severin, another new bridge over that river completing the direct through route from west to east. Some 68 miles of new construction as well as the bridge are involved, but the opening of this line will save 62 miles on the through journey, and 80 miles as between Belgrade and Bucharest.

In this connection it is of interest to note that the Orient express, which before the German-Czech crisis ran through part of Czechoslovakia—from Bratislava to Szob—now skirts that country and enters Hungary directly from Austria. A supplementary fare in respect of the additional mileage so involved is now charged.



Sketch map showing the old and new routes of the Simplon-Orient Express in Jugoslavia and Roumania

Central Line Extension, London Transport

The westward extension of the tube for eight miles from North Acton to Ruislip which is being built at a cost of £2,500,000 by the G.W.R. and over which will be extended the London Transport Central Line services, is progressing rapidly. Already the steam trains have been diverted to new tracks between Wood Lane and North Acton, thus leaving margin for a more frequent service of electric trains.

During the past twelve months, the widening of embankments and cuttings of the G.W.R. main line between North Acton and Greenford, a distance of over three miles, has been proceeding to provide room for the two new electrified lines. The preparation of the ground to carry these lines is well under way and good progress has been made with the retaining walls. The scheme has involved the construction of a fly-under bridge under the present electric lines near North Acton, a viaduct at Brentham over the River Brent, and another over the steam lines near Perivale. In addition, nine other bridges are nearly completed and another viaduct a quarter of a mile long and three more bridges at Greenford are well in hand.

At Hanger Lane, Perivale, and Greenford, the foundations have been prepared for the new station buildings on which work will be started in the New Year. Early next year the two bridges at Alperton Lane and Horsendon Lane are to be rebuilt to provide wider roadways, and while this is being done the steam line traffic will be diverted temporarily to the new electric lines between Brentham viaduct and Perivale for a distance of approximately a mile and a quarter.

At Ruislip the constructional work in connection with the extensive car depot is nearing completion. This consists of clearing, levelling, and fencing of the site of about 50 acres, erection of the main shed (which covers an area of 5 acres), offices and workshops (1,000 ft. × 40 ft. wide), cleaning shed (449 ft. × 59 ft. wide), and the washing shed through which trains will pass to be mechanically washed.

A concrete roadway half a mile long and gas and water mains have been laid. Provision has been made for a three-track traverser in the lifting bay and an air-raid shelter under the canteen to accommodate 100 persons with communicating passages to the track pits of the main shed and to the open fields. Work is now proceeding with the mechanical equipment of this depot, which is expected to be completed by the end of next summer.

A contract is expected to be placed shortly for the work yet to be done on the scheme, which includes the construction of the line between Greenford and Ruislip, and the building of new stations at Northolt, South Ruislip, and Ruislip & Ickenham.

Accident on Line Equipped with A.T.C.

A collision on the New York Central raises question of drivers' conduct after cancelling automatic brake application on sighting adverse signals

A collision occurred on July 31 last, at about 7.0 p.m., at Rocky Ridge, Ohio, on the New York Central Railroad, when the No. 68 Commodore Vanderbilt express, from Chicago to New York, ran into the rear of the No. 76 Mercury express (streamlined), from Detroit to Cleveland, which, normally running 10 min. in front, had been stopped specially out of course under the impression that a motorcar had been run down at a crossing. One passenger was killed. The case is of special interest as the line was fitted with A.T.C., of the intermittent inductive type, and the principal facts are therefore reproduced from our contemporary, *Railway Signaling*, for October, 1938, in which an extract is given from the report of the Bureau of Safety, Interstate Commerce Commission.

The line is signalled with automatic signals of the two-position home and distant semaphore type, and the block section in rear of the point of collision was 1,950 yd. long (see diagram). At every distant signal there is a track inductor which produces a warning on the engine, followed by a non-cancellable brake application if the driver fails to operate the so-called forestaller handle to show he is paying attention. If he operates this handle the control of the train is left to his judgment. There is an excellent view, both of the signals and the line ahead, as the track is quite straight for many miles near the point concerned.

The "caution" indication of the distant signal is defined in the rules as "Proceed, preparing to stop at next signal; train exceeding medium speed must at once reduce to that speed." The latter is defined as 30 m.p.h. A further rule says that drivers may not operate their forestaller handle until they have complied with these requirements. There was a down grade of 0·04 per cent. in the direction in which the trains involved were running.

The first train—the Mercury—struck, or was believed to have struck, the front end of a motorcar at the crossing, and pulled up with its rear 2,213 yd. farther on. The guard then had it backed up until it was only 403 yd. off, and 77 yd. beyond an automatic signal. He did not send any flagman back first, as the rules required; the latter rode back on the train, but when it stopped got off and went with a brakesman to find the damaged motorcar, but there was none to be seen. At the crossing they sighted the headlight of the Commodore Vanderbilt express, 1½ miles off, and a red flag was waved but no whistle acknowledgment was received until the train was 500 yd. from them. There was some dispute about rain and the visibility at the time, but the flagman, it was held, ought to have lighted a fusee signal. The sun was not due to set for another 16 min. and the oncoming train was heading east, so that the view should have been fairly good.

Engineman's Action

The driver of the Commodore Vanderbilt declared he was running about 75 m.p.h. on sighting the distant signal at "caution" but did not at once reduce to 30 m.p.h., as required by the rules. He reduced to 70 m.p.h. at the signal and operated the forestaller handle, afterwards making other brake applications, with an emergency one, accompanied by reversal of the engine, on seeing the flagman. Nevertheless the speed recorder band showed that the train was still travelling at 75 m.p.h. when only 833 yd. from the point of collision or 756 yd. from the "stop" semaphore which the distant warning announced. This is confirmed by the experiences of other employees, some of whom said the train was steaming until quite near to them. The driver made the extraordinary statement that he would have made a heavier brake application and been able to stop at the automatic signal at danger had he known that the other train was where it was, a strange doctrine to put forward to explain disobedience to signals! He also thought that the A.T.C. apparatus, if left to act, would have stopped him in rear of the other train.

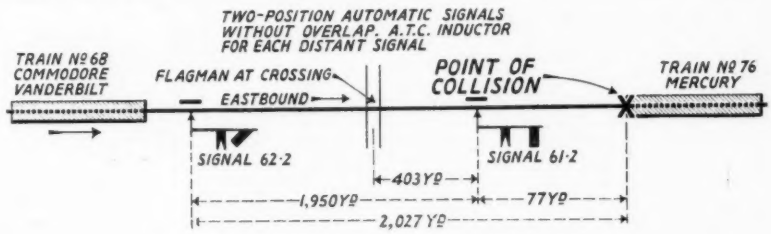


Diagram of collision, N.Y.C.RR., July 31, 1938

Brake Tests

Some interesting brake experiments were made in order to test the accuracy of the evidence offered, and they are of importance to all those concerned in A.T.C. problems. With a train made up to represent the Commodore Vanderbilt, travelling at 76 m.p.h., the inductor at the distant signal was allowed to produce the automatic service brake application and the train was stopped in 1,702 yd., or 248 yd. in rear of the stop signal and 325 yd. in rear of the other train. In the next test the speed was 86 m.p.h., and an emergency brake application was made as the distant signal was passed and steam was shut off, when the train was pulled up in 1,037 yd. or 989 yd. from the obstruction. In the third test an attempt was made to reproduce the brake pipe reductions which the engineman said he made, and the train stopped in 1,531 yd. from the point where the first reduction was made, or 829 yd. in rear of the obstruction. Even allowing for a wet rail on the night of the accident, these figures show that had the signal indications—which the driver had clearly seen—been obeyed there would have been no difficulty at all in stopping well clear of the stop signal.

An important point in this case is that the Bureau of Safety had already found it necessary on previous occasions to emphasise the failure of drivers to control their trains properly, after having seen the distant signal "on" and operated the forestaller handle. The inspectors have drawn attention to the dangerous practice of running on yellow signals without reducing speed as required by the rules, and the question of eliminating the forestaller handle has been raised. If the existing rules, which are quite clear and definite, cannot be adequately enforced then the possibility of supplementing the present A.T.C. apparatus by some speed control equipment would need consideration.

This accident is of interest to European railway managements who are studying the A.T.C. question. It seems absurd that any flagman should be necessary on a line fully track-circuited and with A.T.C. at the distant signals. As was reported at the last International Railway Congress, some European administrations have abolished hand signal protection of standing trains, except when all wheels are derailed, on sections that are fully track circuited. The driver of the Commodore Vanderbilt was apparently running on the assumption that the next automatic signal would clear in time for him and that he would meet a flagman at sufficient distance from any unusual obstruction, as the rules in fact provided. It is a question whether the use of flag protection on

lines fitted with the type of signalling found in this case does not tend to diminish the respect paid to the fixed signals, which, with A.T.C. added, ought to afford all-sufficient safeguards. If drivers, however, cannot be trusted to obey the signals and an A.T.C. warning as well, strictly in accordance with rules, but continue to drive dangerously thereafter, a very serious situation is produced and some automatic speed control, similar to that incorporated in the Reichsbahn A.T.C. system, is the only positive remedy. It is to be noted that the braking provided on the Commodore Vanderbilt train was very efficient and afforded no excuse to the driver for his failure to stop.

Widening the Harrow-Rickmansworth Line

In connection with the 7½-mile widening of the Metropolitan Line from North Harrow to Rickmansworth, 37 bridges will have to be altered and six stations reconstructed. Twenty-four of the bridges concerned carry the railway over roads, three over rivers (the Colne, the Gade, and the Chess), one over the Grand Union Canal, and one over the L.M.S.R. branch line from Watford to Rickmansworth. Eight bridges carry roads over the railway.

Each of the six stations involved—North Harrow, Pinner, Northwood Hills, Northwood, Moor Park, and Rickmansworth—will have to be adapted to take two additional tracks. At most stations the platform on the east side will remain unaltered, the west platform will be made into an island, and a new platform will be built on the west side.

The two new tracks will be laid on the west side of the existing tracks, and will be used by the L.N.E.R. and Metropolitan fast trains. The present tracks will be used exclusively by Metropolitan local trains. The addition of the new tracks will necessitate the widening of the top of the embankment to 58 ft., almost double its present width. The destruction of trees is being avoided as far as possible, and in many places they will be left growing right up the bank.

The largest single undertaking will be the reconstruction of the bridge over the main Rickmansworth—Pinner road between Northwood and Northwood Hills stations, which the Middlesex County Council has decided to widen. Only 25 ft. broad at this spot, the road dives under the railway through a switchback tunnel which has long been a danger point for motorists and pedestrians. The road crosses the railway at an acute angle, and to widen it to 60 ft., as the council intends, will mean that the railway bridge in its turn will have to be widened to 140 ft. The work is expected to be finished by December, 1940.

York Passenger Station Extension

Stages completed in alterations to platforms and signalling

Considerable progress has now been made with the extension and rebuilding of York passenger station, L.N.E.R. The new island platform to the west has been completed and one side, which will be known as No. 15 platform, has been brought into use. Subways have been extended to serve the new island and six new electric lifts have been installed. A welded steel extension has also been made to the old footbridge, so that it now gives access to all platforms. On September 26, the platforms were renumbered in a geographical sequence, and during the weekend October 1 and 2, the bridging of the gap in the Leeman Road bridge was completed. A refreshment room and lounge, a kiosk, and conveniences have been provided on the new island platform and are now in use, whilst on the extended No. 14 platform, part of which has been in use during the summer working, new refreshment rooms and lounges are in the course of construction. Two new modern kiosks are also being built on No. 9 platform.

Progress has also been made in connection with the signalling arrangements. Those for No. 14 platform have been remodelled, and those for No. 15 platform have been completed and are now in use. Both these platforms may be used from either the north or the south direction. Electrical route indicators have been provided in connection with the signals which control the working from the down main and down Leeds lines into the station. The interlocking of the 295-lever frame in the locomotive yard signal box has been rearranged and at the north end of the station a temporary signal box accommodating a frame of 110 levers has been built, to take the place of the present Waterworks signal box; in addition, a large amount of preparation work has been completed in readiness for the change-over from the present to the new temporary box. When this has been brought into use the old Waterworks box will be demolished and an extension to the permanent way will be made over its site.

Alterations have also been carried out at Clifton signal box, a rearrangement of the interlocking having been made to embrace permanent-way alterations. The new working will necessitate the lines controlled from Leeman Road signal box being rearranged and resignalled and the frame in that box will have to be relocked. The working will be carried on from these boxes until the electro-pneumatic power signalling is brought into use, when control will be transferred to a new modern signal box in the station which will be the largest of its kind in the world.

One result of the alteration work is the temporary removal of the famous zero post, which disappeared some months ago. This particular post, with its ten sets of letters, is unique in that no other zero post in the country forms the starting point of so many measured distances. It refers to "9, Victoria, c. 2, s. 94," which laid down that all railway companies "shall cause the length of railway to be measured; milestones, posts or other conspicuous objects to be set up and maintained along the whole length thereof at a distance of a quarter, half, and three-quarters of a mile from each other." The York zero post will be reinstated when the alterations at the station are completed.

Another Metropolitan Line Changeover

On the night of November 5-6 the rearrangement of tracks on the Metropolitan Line of London Transport, already achieved between Finchley Road and Dollis Hill, was extended from the latter station to a point between Preston Road and Northwick Park. This new section involved the bringing into use of the burrowing junctions for Stanmore trains at Wembley Park and for trains proceeding into the carriage depot at Neasden, also the extensive alterations to signalling mentioned on page 642 of our October 14 issue. As rearranged, the order of lines from left to right (facing London) at all stations from Preston Road to Finchley Road inclusive is: Up fast, up slow, down slow, down fast. Before the changeover was begun the order of lines at Preston Road was up slow, down slow, up fast, down fast; but between there and Wembley the fast and slow pairs changed sides.

To carry out the work accomplished on November 5-6, the Engineers' Department had possession from the passing of the last of the Saturday service trains in the small hours of Sunday until 5.0 that morning. The only break in service was between Northwick Park and Preston Road stations on Sunday, as in this section it was necessary to instal a crossover to restore the lines northward to their former order, as they will remain until Harrow-on-the-Hill station is rebuilt. The engineers again had complete possession for four hours early on Monday morning. Their work included taking 16 sets of points out of commission and installing 36 new sets.

The next stage in carrying the Metropolitan Line improvements northwards will be the widening to four tracks of the double-line section between Harrow and Rickmansworth, where both Metropolitan and L.N.E.R. traffic is carried. (See description in adjoining column.)

NOTES AND NEWS

Carter Paterson in the Midlands.—On October 19 the name of Leicester & County Carriers Limited—one of the Carter Paterson group—was changed to Carter Paterson (Midland) Limited.

Thirty Injured in Argentine Buffer Stop Collision.—Thirty persons were injured when a train crashed into the buffers at the Buenos Ayres Great Southern Railway terminus at Buenos Aires last Monday.

Argentine State Purchase of Railways.—According to a Reuters message from Buenos Aires, a decree was published on November 4 summoning an extraordinary session of the Argentine National Congress. The session will deal principally with the Budget, and the State purchase of the Central Cordoba and Transandine Railways.

L.M.S.R. Empire Exhibition Trains.—During the period of the Empire Exhibition at Glasgow, the L.M.S.R. ran in connection with it no fewer than 1,885 excursions, conveying approximately 602,500 passengers, from all parts of the system. Day trips have been run from London every week-end during the exhibition, and over 19,000 persons were carried in 50 such trains from London alone.

Agreed Charges.—As will be seen from the legal notice published on page 840, applications are being made to the Railway Rates Tribunal for approval of 77 agreed charges. Copies of these applications (1s. each, post free) can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, Fielden House, Great College Street, Westminster, S.W.1. Notices of objection must be filed on or before November 29.

Strengthening Unstone Viaduct, L.M.S.R.—Unstone viaduct, which carries the L.M.S.R. main line between Chesterfield and Sheffield at a height of 60 ft. over the River Drone, consists of seven brick-arch spans and has a total length of nearly 300 ft. To make it suitable for carrying the heaviest locomotives, it is being repaired and strengthened. A reinforced concrete raft will be placed over the top of the arches, and to facilitate the work temporary crossovers have been laid in at both ends of the viaduct, so that single-line working may be operated at week-ends until next March. Unstone viaduct was originally built in 1868-1870.

Free S.R. Car Parks for Rail Passengers.—An interesting experiment is being tried by the Southern Railway at Sevenoaks, Leatherhead, and Woking stations, for the benefit of rail travellers who live at some distance from the station and wish to park their cars during their visits to town. Beginning on Monday last, November 7, and extending until January 31, 1939, the Southern Railway will waive the usual car-parking fees of 1s. a day (season tickets 2s. 6d. a week, &c.) to all who travel by rail. For season ticket holders, all that will be necessary will be the production of the season ticket. For other passengers, the car park ticket will be taken in the usual way and presented at the booking office, when buying the rail ticket, and it will then count as cash.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for the month of September, 1938, amounted to $15,785,000, an increase of $1,430,000 in comparison with September, 1937. Working expenses were $12,134,000, or $920,000 higher, leaving net earnings $510,000 higher, at $3,651,000. Aggregate gross earnings for the first nine months of 1938 were $100,346,000, a decrease of $4,756,000, and the net earnings for the same period showed a fall of $5,744,000 in comparison with the first nine months of 1937.

Canadian National Earnings.—The September, 1938, gross earnings of the Canadian National Railways were $17,849,629, a decrease of $80,810 compared with September, 1937. Operating expenses amounted to $15,188,190, with a decrease of $399,764, resulting in net earnings of $2,661,439, which were higher by $318,954. Aggregate gross earnings for the first nine months of 1938 amounted to $130,337,434, a decrease of $15,737,865, and there was a deficit for the nine months of $2,455,254, as compared with net earnings of $10,527,862 for the first nine months of 1937.

Buenos Aires Transport Corporation.—A Decree was published on November 3 fixing the capital of the new Buenos Aires Transport Corporation at 670,684,476 pesos (about £35,300,000). The nominal capital holdings are as follow: The State, 36,719,594 pesos (about £1,932,000); the Municipality of Buenos Aires, 109,527,242 pesos (£5,765,000); the Anglo-Argentine Tramways Co. Ltd., 210,167,301 pesos (£11,061,500); Buenos Ayres Lacroze Tramways Company, 36,026,998 pesos (£1,896,000); Buenos Aires Central Railroad & Terminal Company, 62,875,750 pesos (£3,309,250); and the Buenos Aires Town & Docks Tramways Limited, 10,064,232 pesos (£530,000), according to a Reuters message dated November 3 from Buenos Aires.

L.M.S.R. (London) Dramatic Society.—On November 4 and 5, the L.M.S.R. (London) Dramatic Society gave two performances of "Berkeley Square" at the Fortune Theatre, W.C.2. The story of the American tenant of a venerable London house who slips back two centuries into the shoes of an ancestor has its moments of humour and pathos, and William Southern, as Peter Standish, adequately conveyed the struggle between his twentieth century inclinations and his knowledge of his eighteenth century destiny. As Helen Pettigrew, the girl whom Standish wooed in defiance of history, Margaret Kilby gave the most convincing performance of the evening, and Nancy McIntosh made the best of the less sympathetic part of her sister. Some performances of distinction were seen in the shorter parts, particularly by Marjorie Groves as the Lady Anne Pettigrew, Doris Humphries as the Duchess of Devonshire, and Richard King in his very brief appearance as the Duke of Cumberland. The part of Mr. Throstle, the collector of water-colours moving in a male society otherwise composed of heavy drinkers and reckless gamblers, was given the proper air of supercilious detachment by Reginald Bebbington.

Traffic in the Sudeten Territory.—The Deputy General Manager of the German State Railway, Herr Kleinmann, paid a visit recently to the lines in the ceded Sudeten territory and investigated the question of restarting the railway services, after the removal of the rolling stock and other equipment by the Czech authorities. Some trains are stated to have been running again within 24 hr. of the entry of the Reich forces. The question of staffing the lines with Sudeten Germans has been discussed with the new local authorities. On pages 776 and 805 last week we recorded brief details of the arrangements for restoring trans-border trains, certain of which began to run on November 1. This week (at page 817) reference is made in our Overseas columns to further travel developments. Since we received that information, it has been reported that railway communication between Prague and Brno (Brunn) and between Bratislava (Pressburg) and Brno, through territory ceded to Germany, was resumed on Saturday, November 5.

G.W.R. Ambulance Gathering at Paddington.—The newly-opened Clerks' Dining Club, now occupying the fourth floor of the Parcels Office building at Paddington, was the scene, on October 20, of an enthusiastic gathering of ambulance workers, when examination awards were distributed by Mr. C. T. Cox, Divisional Superintendent. Mr. J. R. Williams, Stationmaster, presided, and among the large company present were Sir H. V. Kenyon, late Mayor of Paddington, Mr. R. C. Kirkpatrick, Divisional Engineer, Mr. R. A. P. Setterfield, Manager of the Hotels and Refreshment Department, and a number of railway and ambulance officials. The recipients of awards, which numbered upwards of 200, included members of the Great Western Railway staff, who form the 37th Division of the St. John Ambulance Brigade. Among the awards distributed were 15 gold medals and bars for periods of efficient ambulance service from 15 to 30 years. The congratulatory remarks by Mr. Cox to the members for their devotion to a noble cause were echoed by Sir H. V. Kenyon and the Assistant Commissioner of the St. John Ambu-

lance Brigade, Mr. F. J. Warren. The proceedings were interspersed by selections by the G.W.R. Staff Band and contributions by local artistes.

Whitland Station, G.W.R., to be Remodelled.—The passenger, goods, and locomotive accommodation at Whitland, G.W.R.—junction for the Cardigan and the Tenby and Pembroke Dock branch lines and also for the lines to Fishguard and Milford Haven—is to be remodelled. The two island platforms are to be lengthened westward by 120 ft. and 160 ft. respectively, and the down platform is to be widened by 12 ft. on the Tenby branch side and a new waiting room provided. New station buildings will be provided, and the verandah roof covering to the platforms extended. The existing locomotive depot is to be demolished and a new one erected on a more convenient site half a mile west of the station. This will allow the mileage yard and other siding accommodation of the goods station to be remodelled and extended. The existing goods shed will be demolished and a new one constructed on the site near the old locomotive depot and alongside the passenger station. A separate warehouse will be provided adjacent to the goods shed. Provision will be made for additional signalling and the complete track circuiting of the running lines at the station.

Railways to Develop Australian Northern Territory.—The Australian Federal Minister for the Interior, on his return from a recent tour of the Northern Territory and Kimberley area, expressed his conviction that practical measures must be taken for their development and colonisation. In this connection, Sir James Connolly, former Agent-General for Western Australia, told a representative of the *Daily Telegraph and Morning Post* that the construction of two railways would go far towards this end. They were: (1) from Wyndham, on the north coast, down Hall's Creek and westwards along the rich gold-bearing Leopold Range to Yampi Sound, a large and safe harbour; and (2) a line to connect Hall's Creek with Camooweal on the Queensland Railways.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 44th Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
L.M.S.R. (6,834¼ mls.)	£	£	£	£	£	£
Passenger-train traffic...	420,000	417,000	+ 3,000	23,272,000	23,260,000	+ 12,000
Merchandise, &c. ...	464,000	542,000	− 78,000	19,801,000	21,863,000	− 2,062,000
Coal and coke ...	271,000	269,000	+ 2,000	10,959,000	11,191,000	− 232,000
Goods-train traffic ...	735,000	811,000	− 76,000	30,760,000	33,054,000	− 2,294,000
Total receipts	1,155,000	1,228,000	− 73,000	54,032,000	56,314,000	− 2,282,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	291,000	288,000	+ 3,000	15,063,000	15,142,000	− 79,000
Merchandise, &c. ...	340,000	362,000	− 22,000	13,885,000	15,020,000	− 1,135,000
Coal and coke ...	262,000	252,000	+ 10,000	10,371,000	10,893,000	− 522,000
Goods-train traffic ...	602,000	614,000	− 12,000	24,256,000	25,913,000	− 1,657,000
Total receipts	893,000	902,000	− 9,000	39,319,000	41,055,000	− 1,736,000
G.W.R. (3,737 mls.)						
Passenger-train traffic...	183,000	179,000	+ 4,000	9,789,000	9,860,000	− 71,000
Merchandise, &c. ...	199,000	211,000	− 12,000	8,186,000	8,845,000	− 659,000
Coal and coke ...	114,000	121,000	− 7,000	4,722,000	4,914,000	− 192,000
Goods-train traffic ...	313,000	332,000	− 19,000	12,908,000	13,759,000	− 851,000
Total receipts	496,000	511,000	− 15,000	22,697,000	23,619,000	− 922,000
S.R. (2,140 mls.)						
Passenger-train traffic...	274,000	265,000	+ 9,000	14,569,000	14,608,000	− 39,000
Merchandise, &c. ...	58,000	58,000	—	2,682,500	2,806,000	− 123,500
Coal and coke ...	29,000	23,000	+ 6,000	1,331,500	1,332,000	− 500
Goods-train traffic ...	87,000	81,000	+ 6,000	4,014,000	4,138,000	− 124,000
Total receipts	361,000	346,000	+ 15,000	18,583,000	18,746,000	− 163,000
Liverpool Overhead ... (6½ mls.)	1,283	1,279	+ 4	59,883	57,358	+ 2,525
Mersey (4½ mls.) ...	4,648	4,561	+ 87	193,393	185,409	+ 7,984
*London Passenger Transport Board ...	577,500	570,800	+ 6,700	10,747,200	10,692,500	+ 54,700
IRELAND						
Belfast & C.D. (80 mls.) pass.	1,742	1,797	− 55	112,128	115,941	− 3,813
,, ,, goods	490	489	+ 1	19,217	21,472	− 2,255
,, ,, total	2,232	2,286	− 54	131,345	137,413	− 6,068
Great Northern (543 mls.) pass.	9,800	9,300	+ 500	496,450	500,450	− 4,000
,, ,, goods	10,700	10,500	+ 200	401,850	419,750	− 17,900
,, ,, total	20,500	19,800	+ 700	898,300	920,200	− 21,900
Great Southern (2,076 mls.) pass.	32,220	32,495	− 275	1,646,252	1,643,899	+ 2,353
,, ,, goods	52,322	56,146	− 3,824	1,777,954	1,832,007	− 54,053
,, ,, total	84,542	88,641	− 4,099	3,424,206	3,475,906	− 51,700

* 19th week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices Nov. 9, 1938	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	67⅝	55¾	28	−1/2
5% Con. Prefce....	127	108	92½	—
5% Red.Pref.(1950)	113	109	97½	—
4% Deb.	113⅝	102½	103½	—
4½% Deb.... ...	118	106	104½	—
4½% Deb.... ...	124½	112	110½	—
5% Deb.	136½	122¾	122½	—
2½% Deb.... ...	76	64	66½	—
5% Rt. Charge ...	133 16	118	120	+1/2
5% Cons. Guar. ...	133¾	116½	113½	+1/2
L.M.S.R.				
Ord.	36⅛	25⅝	12¾	−1/2
4% Prefce. (1923)	82½	65¾	28½	—
4% Prefce. ...	92½	77¾	51½	−1
5% Red.Pref.(1955)	107¾	102	76½	—
4% Deb.	108	99¼	99½	—
5% Red.Deb.(1952)	117½	111	108	—
4% Guar. ...	104	95⅞	89½	—
L.N.E.R.				
5% Pref. Ord. ...	12½	6¾	4	−1/4
Def. Ord.	6¼	3⅝	2½	−1/8
4% First Prefce.	79½	63	27½	—
4% Second Prefce.	31½	21	10½	—
5% Red.Pref.(1955)	101¼	89¾	45½	—
4% First Guar. ...	103	91⅞	79½	−1
4% Second Guar.	97⅝	85½	58½	−1
3% Deb.	84⅛	74	70½	—
4% Deb.	107¼	98½	93½	—
5% Red.Deb.(1947)	113½	106½	106½	—
4½% Sinking Fund Red. Deb.	110 16	105½	105½	—
SOUTHERN				
Pref. Ord. ...	98⅝	83½	56	+1/2
Def. Ord. ...	27⅞	16¾	13	+1/2
5% Pref.	126 16	105 13 16	96½	—
5% Red.Pref.(1964)	118	110¼	100½	—
5% Guar. Prefce.	133¾	116¾	114½	+2
5% Red.Guar.Pref. (1957)	118½	111½	111½	+1
4% Deb.	112	101¼	103½	—
5% Deb.	135¾	123½	122½	—
4% Red. Deb. 1962–67	113	105	105½	—
BELFAST & C.D.				
Ord.	5	4	4	—
FORTH BRIDGE				
4% Deb.	106	99½	100½	—
4% Guar. ...	105¾	99	99½	—
G. NORTHERN (IRELAND)				
Ord.	11	5	3	+1/2
G. SOUTHERN (IRELAND)				
Ord.	50	21½	14	+3
Prefce.	61	34	19½	—
Guar.	94¾	69½	39	—
Deb.	95	82⅛	62	−3
L.P.T.B.				
4½% "A" ...	123¾	110½	114½	−1
5% "A" ...	135	121½	122½	−1
4½% "T.F.A." ...	108¾	104	104½	+1/2
5% "B" ...	125	114½	115½	−1
"C"	99¾	75	75½	—
MERSEY				
Ord.	42⅝	22	20	—
4% Perp. Deb. ...	103	96¾	97½	—
3% Perp. Deb. ...	77⅝	74½	71½	+4
3% Perp. Prefce.	68¾	61¼	55	—

RAILWAY AND OTHER REPORTS

Taltal Railway Co. Ltd.—The directors recommend the payment of a dividend of 1 per cent., or 1s. a share, less income tax at 5s. 6d. in the £1, for the year to June 30, 1938.

British Electric Traction Co. Ltd.—The company announces an interim dividend of 2½ per cent. on the deferred ordinary stock, on account of the year ending March 31 next, payable December 15. This is at the same rate as a year ago, but on a capital increased by the 10 per cent. scrip bonus issued last June.

Metropolitan Assented Stock.—Glyn, Mills & Co., the trustee and registrar under the trust deed relating to the Metropolitan Assented Stock constituted by Section 89 of the London Passenger Transport Act, 1933, announces that a final interest payment at the rate of 2¼ per cent., less tax, on such assented stock (making with the interim payment of 1 per cent. made on April 19, 1938, the full interest rate of 3¼ per cent. for the year ended June 30, 1938) will be posted to registered holders on November 19.

Argentine North Eastern Railway Co. Ltd.—Gross receipts for the year ended June 30, 1938, were £699,030, compared with £659,966 for the previous year. Working expenses were £486,993, an increase of £19,669, with an operating ratio of 69·67 per cent., against 70·81 per cent., and net receipts rose from £192,642 to £212,037. Deducting exchange losses and differences of £59,098 (against £59,743) leaves a balance of £152,939, to which has to be added £981 miscellaneous revenue, making a total of £153,920. Interest on the 5½ per cent. prior lien debenture stock and the 5 per cent. A debentures and debenture stock, amounting altogether to £65,170, has, as usual, been paid in full, but although the earnings of the railway are improving, the financial position has not permitted the recommencement of interest payments on the 5 per cent. B debentures and debenture stock, owing to the necessity of reducing indebtedness and carrying out urgent renewals and other works.

Entre Rios Railways Co. Ltd.—For the year ended June 30, 1938, gross receipts amounted to £1,064,166, an increase of £111,742 in comparison with 1936-37. Working expenses, which were 77·65 per cent. of gross receipts, against 79·42 per cent., advanced from £756,419 to £826,364, and net receipts improved from £196,004 to £237,802. Exchange losses and differences amounted to £68,233, against £67,027, leaving a balance of £169,569, to which must be added £35,460 amount realised in respect of interest awarded on balance payment for expropriation of Hasenkamp line, and £468 miscellaneous revenue, making a total of £205,497. The interest moratorium on debenture issues has been extended until July 1, 1939. In addition to the payments of two and a half years' interest on the 4 per cent. debenture stock mentioned in the last report, further payments representing one and a half years' arrears on that stock have since been made. Two years' arrears remain outstanding on this stock at the present date.

Argentine Great Western Railway Co. Ltd.—The report for the year to June 30, 1938, shows that under the working agreement this company received from the Buenos Ayres & Pacific Railway Company and distributed in respect of the year: interest on the 1st and 2nd debenture stock paid January 1 and July 1, 1938, £136,000. The Company also received from the Pacific Company £272,600, and paid one year's interest on the Great Western 5 per cent. debenture stock. In addition it received a further £136,300, being one half-year's interest on this stock, paid on July 28 last, thus bringing the payment of arrears up to October 1, 1934. The Pacific Company was unable to make any payment on account of the dividend on the Great Western 6 per cent. guaranteed preference stock.

Railroad Credit Corporation.—The seventh annual report to the stockholders, dealing with the fiscal year ended September 30, 1938, shows that the outstanding loan balances due to the corporation progressed to the extent of $1,138,007.84, leaving the balance at that date $29,011,331.03, as against $21,149,338.87 a year ago. There were three additional liquidating distributions made during the year, returning to the participating carriers $1,837,788.40, or 2½ per cent. of their original contributions to the fund established under the Marshalling and Distributing Plan, 1931. Of the three borrowing carriers not in bankruptcy mentioned in the last annual report, one paid in full during the year, one with a balance of but $3,844.92 will have to be carried for the present, and the third succumbed to financial difficulties. There remain 14 carriers operated by bankruptcy trustees and three by equity receivers. These combined balances account for the remaining $20,007,486.11 of the outstanding loans. To date hearings before the Interstate Commerce Commission on reorganisation plans of 12 of the 14 Section 77 roads represented have been closed and briefs filed. With the possibilities of procedural delay it is difficult to estimate when the first plan will be submitted to creditors and stockholders for acceptance.

William Asquith Limited.—Trading profits for the period from July 2, 1937, to August 11, 1938, were £110,820. After providing for directors' fees, N.D.C., &c., a net profit is shown of £101,289. After making provision for income tax and preference dividend, there is a balance available of £75,552. A maiden distribution of 5 per cent. is being made on the ordinary shares in respect of the period to August 11, and a sum of £50,000 is appropriated to general reserve, leaving £20,555 to be carried forward. As a result of the scheme of arrangement carried through during the past year, the adverse balance of £59,632 for the period April 3, 1936, to July 1, 1937, was written off.

Colvilles Limited.—An ordinary interim dividend of 3 per cent. actual, less tax, is being paid on November 30, in respect of the year 1938. This is at the same rate as a year ago.

Guest Keen & Nettlefolds Limited.—An interim dividend is announced on the ordinary stock of 2½ per cent., free of tax, payable on December 17. This compares with 3 per cent., free of tax, a year ago.

Serck Radiators Limited.—Preliminary figures for the year ended July 30, 1938, show a profit of £54,683 (against £49,500 in 1936-37). The directors recommend payment on the increased capital of 3s. per £1 stock and a cash bonus of 1s. per £1 stock. A sum of £25,000 is being transferred to general reserve.

Butler Machine Tool Co. Ltd.—The directors recommend a dividend of 15 per cent. and a bonus of 2½ per cent. on the ordinary shares for the year ended September 30, 1938. For the period covered by the first accounts (January 18 to September 30, 1937) the dividend was 10 per cent., but no bonus was paid.

John I. Thornycroft & Co. Ltd.—The directors recommend for the year ended July 31 a payment of 7½ per cent. on the participating preferred ordinary shares (against nil), and of 8 per cent. on the ordinary shares (against nil). Last year the company paid off six years' arrears of preference dividends. It is proposed also to transfer £50,000 to special reserve and £50,000 to general reserve. The present dividend is the first paid on the ordinary shares since 1929-30.

Tecalemit Limited.—Profit for the year ended July 31 last amounted to £62,451, against £45,020 for the previous year. Adding £14,383 brought in, gives a total of £76,834. After providing for directors' fees and for a further appropriation of £16,000 for taxation, a dividend is being paid at the rate of 18 per cent. per annum, less tax, which absorbs £44,729 and leaves £15,580 to be carried forward. During the year a working arrangement has been made with Laycock Engineering Co. Ltd., under which both companies continue to manufacture garage equipment, and Tecalemit Limited takes over the entire marketing of Laycock garage equipment, in addition to its own. Factory extensions have rcently been completed and additional machinery installed at Coventry in order to cope principally with aviation products. New factory buildings on the land adjoining the main factory at Great West Road are expected to be ready for occupation early in the new year.

XUM

LEGAL AND OFFICIAL NOTICES

In the Court of the Railway Rates Tribunal.

Road and Rail Traffic Act, 1933.

Agreed Charges.

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

The Procedure to be followed in regard to the inspection of the said Applications and the filing of Notices of Objections is that published in the *London Gazette* of 28th July, 1936.

Printed copies of the Procedure can be obtained from the Railway Rates Tribunal, Bush House, Aldwych, London, W.C.2.

Notices of Objection to any of the said Applications must be filed on or before the 29th November, 1938.

A copy of each Application can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, Fielden House, Great College Street, Westminster, London, S.W.1, price 1s. post free.

T. J. D. ATKINSON,
Registrar.

4th November, 1938.

SCHEDULE.

Number of Application	Name of Trader and General Description of Traffic
1938	
No. 674	ARTHUR BERTON LIMITED, Britannia House, 256, 260, Old Street, London, E.C.1; Surgical Dressings, Druggists Sundries, etc.
No. 675	ABSOLOM CROCKER & CO. LTD., 1, Crutched Friars, London, E.C.3; Tea, Coffee, Jellies, etc.
No. 676	W. H. VOWLES & SONS LTD., 9–11, Broad Weir, Bristol; Baskets, etc.
No. 677	HENRY BRUCE & SONS LTD., Kinleith Mill, Currie, Midlothian; Paper.
No. 678	MOULDS & MOORE LIMITED, Barwell, Leicester; Boots, Shoes, etc.
No. 679	PILSNER URQUELL CO. LTD., 77–79, St. Thomas Street, London, S.E.1; Beer, etc.
No. 680	THOMAS & EVANS LIMITED, Porth, South Wales; Provender.
No. 681	HELLIWELL & SUTCLIFFE, Hollins Works, Mytholmroyd, Yorks; Clothing.
No. 682	PAUL WALSER & CO. LTD., Reslaw House, Great Marlborough Street, London, W.1; Hats, Millinery, etc.
No. 683	H. T. H. PECK LIMITED, Elizabeth Street, North Evinton, Leicester; Hosiery.
No. 684	THE SOMERSET & DORSET BOX CO. LTD., Boxall Works, Yeovil; Cardboard Boxes, etc.
No. 685	STEVENS & WILLIAMS LIMITED, Brierley Hill Glass Works, near Stourbridge; Glassware, Lighting Equipment, etc. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
No. 686	WILLIAM GOODACRE & SONS LTD., Ceylon Mills, Russell Road, Victoria Docks, London, E.16; Carpeting, Rugs, etc.
No. 687	LAWRENCE CABINET LIMITED, Minerva Works, Fazeley Street, Birmingham, 5; Bedsteads, Folding Tables, etc.
No. 688	H. S. WHITESIDE & CO. LTD., 10, Parkhouse Street, Camberwell, London, S.E.5; Confectionery, etc.
No. 689	KERSANS LIMITED, 25, Bath Street, Leith; Bacon, etc.
No. 690	THE FLEETWAY MANUFACTURING CO. LTD., Winton House, St. Andrew Street, London, E.C.4; Kitchen Furniture, etc.
No. 691	NORFOLK CANNERIES LIMITED, Victoria House, Bloomsbury Square, London, W.C.1; Fruit and Vegetables in tins, etc.
No. 692	RANSOMES, SIMS & JEFFERIES LIMITED, Orwell Works, Ipswich; Lawn Mowers for repair.
No. 693	STERLINGS LIMITED, Pudsey; Boots and Shoes.
No. 694	J. SALMON LIMITED, 102 and 104, London Road, Sevenoaks; Printed Matter.
No. 697	CARPET TRADES LIMITED, Kidderminster; Carpets, etc.
No. 698	C. COMBRIDGE LIMITED, 4 and 5, New Street, Birmingham, 2; Books, Stationery, etc.
No. 699	GEO. DAVIDSON & CO. LTD., Teams Glass Works, Gateshead-on-Tyne, 8; Glassware.
No. 700	WALTER P. EDMUNDS LIMITED, Kings Hall, Wednesbury, Staffs; Hardware and Castings.
No. 701	M. J. GLASSMAN, 138–140, Islington, Liverpool, 3; Hardware, etc. (*Applicable also to traffic consigned by two Associated or Subsidiary Companies.*)
No. 702	A. W. HAINSWORTH & SONS LTD., Spring Valley Mills, Farsley, Nr. Leeds; Woollens and Worsteds. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
No. 703	THE JIFFY AUTOMATIC CLOTHES WASHER CO. LTD., Oxford Street, Accrington; Washing and Wringing Machines.
No. 704	SAMUEL JONES & CO. (DEVONDALE LTD.), Devondale Mills, Tillicoultry; Paper, etc.
No. 705	THE NATURAL FOOD CO. LTD., 210, 212, 214, Cambridge Road, London, E.2; Confectionery, etc.
No. 706	NOBLES & HOARE LIMITED, Cornwall Road, Stamford Street, London, S.E.1; Paints, Enamels, etc.
No. 707	SPRINCOT LIMITED, Whalebone Lane, Dagenham, Essex; Cotton Waste; Fibrous Pads; and Springs.
No. 708	THE WELSH NAVIGATION STEAM COAL CO. LTD., Coedely, Tonyrefail, Glam; Tar Oil Winter Wash.
No. 709	HEATMAN & CO. LTD., Denmark Street, London, E.1; Groceries, Preserves, Provisions, etc. (*Applicable to traffic consigned by one Associated or Subsidiary Company.*)
No. 710	ALGRAPHY LIMITED, Willowbrook Grove, Old Kent Road, Peckham, London, S.E.15; Printing Plates, Lithographic Printing Accessories, etc.
No. 711	ARMY & NAVY STORES LIMITED, 105, Victoria Street, London, S.W.1; Furniture, etc.
No. 712	BAIRD, WOLTON & MAY LIMITED, Barming Cannery, Aylesford, Maidstone, Kent; Canned Goods, etc.
No. 713	BATGER & CO. LTD., Ratcliff, London, E.1; Confectionery, etc. (*Applicable also to traffic consigned by two Associated or Subsidiary Companies.*)

SCHEDULE.

Number of Application	Name of Trader and General Description of Traffic
1938	
No. 714	BRAMFORD'S CHRISTMAS CLUB LIMITED, Bramford House, Kingswood, Bristol; Confectionery.
No. 715	BRINTONS LIMITED, Kidderminster; Carpets, Rugs, etc.
No. 716	COOPER & SONS (SHEFFIELD) LTD., Fuluse Works, Hermitage Street, Sheffield 2; Hardware. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
No. 717	WALTER GREGORY & CO. LTD., Wellington, Somerset; Animal Medicines, etc.
No. 718	H. J. HEINZ CO. LTD., Harlesden, London, N.W.10; Groceries, Preserves and Provisions, ex Cardiff.
No. 719	GEORGE PECK (LEICESTER) LTD., Percy Road, Aylestone, Leicester; Hosiery.
No. 720	M. SAPER LIMITED, Argall Avenue, Lea Bridge Factory Estate, London, E.10; Confectionery and Sugar.
No. 721	THE SHIELDS ICE & COLD STORAGE CO. LTD., North Shields; Preserves, Provisions, etc.
No. 722	THE TAUNTON CIDER CO. LTD., Norton-Fitzwarren, Somerset; Cider.
No. 723	THE TAUNTON CIDER CO. LTD., Norton-Fitzwarren, Somerset; Empties returned to the Trader.
No. 724	THE HORTON MANUFACTURING CO. LTD., Ebury Road, Rickmansworth; Disinfectant, etc.
No. 725	MONSANTO CHEMICALS LIMITED, Victoria Station House, Victoria Street, London, S.W.1; Disinfecting Fluid.
No. 726	MONSANTO CHEMICALS LIMITED, Victoria Station House, Victoria Street, London, S.W.1; Empties returned to the Trader.
No. 727	PERGA LIMITED, 9/10, Bond Court, Walbrook, London, E.C.4; Waxed Paper Cartons, Tin Strips, etc., ex Lower Sydenham. (*Applicable to traffic consigned by one Associated or Subsidiary Company.*)
No. 728	THE SOUTHERN OIL CO. LTD., Westinghouse Road, Trafford Park, Manchester, 17; Lard, etc., ex Cardiff.
No. 729	G. & T. BRIDGEWATER LIMITED, 12, Valentine Place, Blackfriars, London, S.E.1; Biscuits, Confectionery, etc. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
No. 730	PERGA LIMITED, 9/10, Bond Court, Walbrook, London, E.C.4; Waxed Paper Cartons, Tin Strips, etc., ex Gateshead. (*Applicable to traffic consigned by one Associated or Subsidiary Company.*)
No. 731	C. COMBRIDGE LIMITED, 4 and 5, New Street, Birmingham, 2; Books, Stationery, etc.
No. 732	J. & K. CONNOR LIMITED, 44/46, Barbican, London, E.C.1; Hats and Millinery.
No. 733	WALTER GREGORY & CO. LTD., Wellington, Somerset; Animal Medicines.
No. 734	THE LANCASHIRE WATERPROOF COMPANY, No-Leke Mills, Parr Street, Liverpool, 1; Clothing, etc.
No. 735	JOHNSON & SONS LTD., Great Yarmouth; Clothing.
No. 736	DAVID LITTLE & CO. LTD., 30, Park Place, Leeds; Clothing.
No. 737	R. S. NORRISH & SONS LTD., Sampford Peverell; Butter and Cream.
No. 738	T. ROBERTS & SONS LTD., Portland Shoe Works, Leicester; Boots, Shoes, etc.
No. 739	WILLIAM VEAL, 8, Beachfield Avenue, Newquay, Cornwall; Rabbits (dead).
No. 740	WOLSEY LIMITED, King Street, Leicester; Hosiery, etc.
No. 741	WORLDWIDE WHOLESALE WAREHOUSES, Charles Street, Manchester, 1; Clothing, etc.
No. 742	BELAM & BRINLEY, Collins Road, Totnes; Rabbits (dead).
No. 743	EUGENE LIMITED, Edgware Road, Hendon, London, N.W.; Paper Sachets, etc.
No. 744	SAXONE SHOE CO. LTD., Kilmarnock; Boots, Shoes, etc., ex Northampton.
No. 745	JARROLD & SONS LTD., London Street, Norwich; Drugs and Druggists' Sundries, Fancy Goods, Hardware, Stationery, etc.
No. 746	TATTIS POTATO CRISPS LIMITED, Aughton, Ormskirk; Potato Crisps.
No. 747	TRIUMPH ENGINEERING CO. LTD., Dale Street, Coventry; Motor Bicycles.
No. 748	WILLIAMS & PHILLIPS, 9, Burgess Street, Liverpool, 3; Sausages, etc.
No. 749	THE EVER READY CO. (GREAT BRITAIN) LTD., Hercules Place, Holloway, London, N.7; Accumulators, etc. (*Applicable also to traffic consigned by nine Associated or Subsidiary Companies.*)
No. 750	R. & W. WATSON LIMITED, Linwood, Renfrew; Paper, etc.
No. 751	W. FRANCIS & SONS, Boncath, Pembroke; Rabbits (dead).
No. 752	LINTAFELT LIMITED, Resiliency Works, Loudwater, Bucks; "Lintafelt," "Resilinta," etc.

New Zealand Government Railways

APPLICATIONS are invited for the position of Assistant Designing Engineer for the Locomotive Branch of the New Zealand Government Railways. Applicants must be Associate Members of the Institution of Civil or Mechanical Engineers, or have passed an equivalent examination, and be not more than 40 years of age. Salary £615 per annum. Applications close on the 1st December, 1938, with the High Commissioner for New Zealand, 415, Strand, London, W.C.2, from whom a printed statement giving fuller particulars regarding the appointment can be obtained.

Universal Directory of Railway Officials and Railway Year Book
44th Annual Edition, 1938-39

Price 20/- net.

33, Tothill Street, Westminster, S.W.1.

Legal and Official Notices—*continued*

Assistant Engineer

REQUIRED for the Iraqi State Railway for three years. Salary Iraq Dinars 70 a month (I.D. 1 equals £1). Free passages and liberal leave on full salary. The post is not pensionable but there is a Provident Fund Scheme. Candidates, not over 40 years of age, must be Associate Members of the Institution of Civil Engineers or hold an Engineering degree recognised as granting exemption from Sections A and B of the A.M.I.C.E. examination; have had practical experience on a Railway.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/5904.

South Indian Railway Company, Limited

THE Directors are prepared to receive Tenders for the supply of :—

COPPER PLATES

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Copper Plates," with the name of the firm tendering, must be left with the undersigned not later than 10 a.m. on Friday, the 2nd December, 1938.

The Directors do not bind themselves to accept the lowest or any tender.

A charge, which will not be returned, will be made of 5s. for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
9th November, 1938.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

CONTRACTS AND TENDERS

Beyer, Peacock & Co. Ltd. has received an order from the Sligo, Leitrim & Northern Counties Railway for one locomotive boiler.

The Associated Equipment Co. Ltd. has completed a contract from the Northern General Transport Co. Ltd. for 53 Regal oil-engined, single-decked buses.

The Egyptian State Railways Administration has recently placed the following orders :—

P. & W. MacLellan Limited : Pig iron (Ref. No. E.S.R. 6.313, total price £348, delivered f.o.b. Glasgow).

Tubes Limited : Cold drawn steel tubes (Ref. No. E.S.R. 17.235, total price approx. £209, delivery English port).

Porter Bros. Limited : Twine (Ref. No. E.S.R. 43.516, total price £291, delivery f.o.b. Liverpool or Birkenhead).

H. J. Skelton & Co. Ltd. : Mild steel plates (Ref. No. E.S.R. 301 G8/57, total price approx. £741, delivery free Gabbary Quay).

D. Wickham & Co. Ltd. has received an order from the South African Railways & Harbours Administration for the supply of 90 pump trolleys.

D. Wickham & Co. Ltd. has also received an order from the Central Argentine Railway for one standard petrol-driven gang trolley.

The Gloucester Railway Carriage & Wagon Co. Ltd. has received an order from the Crown Agents for the Colonies for eleven bogie goods brake van bodies required for the Nigerian Railways.

The Bengal-Nagpur Railway Administration has recently placed the following orders :—

George Turton Platt & Co. Ltd. : Quantity of buffer heads and plungers.

Taylor Bros. & Co. Ltd. ; 600 carriage and wagon tyres.

Thos. Smith & Son (Rodley) Limited : One five-ton steam travelling crane.

The Mannesmann Trading Co. Ltd. has received an order from the South Indian Railway Administration, to the inspection of Messrs. Robert White & Partners, for the supply of approximately 2,500 steel boiler tubes.

G.W.R. Works to be Undertaken

Barry.—Electric welding plant is being introduced at the locomotive depot.

Swansea East Dock Locomotive Depot.—A new water tank, of 22,500 galls. capacity, is to be installed

Swindon Carriage Works.—A rest room is to be provided for the women employed in the sewing and polishing rooms, Swindon Carriage Department, by the partitioning off of a part of the east end of the sewing room. At the same time messroom facilities for the women staff will be provided in a portion of the old laundry. Another portion of that building will be utilised as a storeroom for seat springs and other bulky articles used by the coach trimmers, which materials are at present stored some distance away. The trimming shop will be further relieved in a congested part by accommodation also being found for axle-box pad-makers in the old laundry.

Tondu.—At the locomotive depot, the steam engine and boiler are to be replaced by an electric motor, two electrically-driven fans also being supplied for the smiths' hearths, in place of the existing blast fan.

Penryn.—A warehouse is to be provided at Penryn to meet increasing storage requirements.

The Southampton Corporation is enquiring for one 15-ton electric trolley locomotive for use at the generating station at Western Esplanade. Tenders must be in by November 22.

The Argentine Government is to invite tenders for the construction of 900 coaches for the State Railways at a cost of about 6,300,000 pesos (approximately £331,600), states Reuters.

We regret that the supplier of the lathes to the Siamese State Railways referred to in this section in our issue of last week was given as the Churchill Machine Tool Co. Ltd. The firm responsible for these is Churchill-Redman Limited.

Forthcoming Events

Nov. 12 (*Sat.*).—Permanent Way Institution (Exeter), at Central Station, 2.30 p.m. "Permanent Way Institution Convention in Germany, 1938," by Mr. W. A. Willox.

Permanent Way Institution (Manchester-Liverpool). Visit to Liverpool Overhead Railway.

Nov. 14 (*Mon.*).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. "Cross-Channel Services from the Passenger Viewpoint," by Mr. A. C. Hardy.

Institution of Structural Engineers (London Junior), at 11, Upper Belgrave Street, S.W.1, 6.30 p.m. "Design and Construction of Buildings for Railway Purposes," by Mr. J. McHardy Young.

L.M.S.R. Centenary Banquet, at Grosvenor House, Park Lane, London, W.1.

Stephenson Locomotive Society (London), at King's Cross Station, L.N.E.R., 6.30 p.m. "Notes on the German Railways," by Mr. W. A. Willox.

Stephenson Locomotive Society (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Model Engineering with Practical Illustrations," by Mr. A. Dunbar.

Nov. 15 (*Tues.*).—Institute of Transport (Leeds Graduate), at City Transport Department, 7 p.m. "Some Aspects of the Law of Road Accidents," by Mr. C. Douthwaite.

Institution of Civil Engineers, Great George Street, London, S.W.1, 6 p.m. "The Principles of River-Training for Railway Bridges and their Application to the Case of the Hardinge Bridge over the Lower Ganges at Sara," by Sir R. Gales.

Institution of Electrical Engineers (East Midland), at Electricity Showroom, Derby, 6.45 p.m. "The Trend of Design of Electric Locomotives," by Mr. C. Fairburn.

L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 6.45 p.m. "Norwegian Night."

Permanent Way Institution (Scottish), at Royal Technical College, George Street, Glasgow, 7.15 p.m. "Relaying," by Mr. W. Paterson.

Nov. 16 (*Wed.*).—Institute of Transport (Metropolitan Graduate), at the Windsor Castle, Victoria, S.W.1, 7 for 7.15 p.m. Annual Dinner.

Nov. 18 (*Fri.*).—Institute of Transport (East Midlands), at Guildhall, Nottingham, 7 p.m. "The Institute Visit to Germany, 1937," by Mr. A. Witcomb Smith.

Institute of Transport (Manchester-Liverpool), at Exchange Station Hotel, Liverpool, 6.30 p.m. "Current Transport Problems," by Mr. C. E. R. Sherrington.

Nov. 19 (*Sat.*).—Railway Students' Association (London). Visit to Cockfosters Depot, Piccadilly Line.

Forthcoming Meetings

Nov. 15 (*Tues.*)—**Argentine Great Western Railway Co. Ltd.** (General), Winchester House, Old Broad Street, E.C.3, at 12 noon.

Nov. 16 (*Wed.*)—**John I. Thornycroft & Co. Ltd.** (Annual), Winchester House, Old Broad Street, E.C.3, at 12 noon.

Nov. 21 (*Mon.*)—**Entre Rios Railways Co. Ltd.** (Annual) River Plate House, Finsbury Circus, E.C., at 2.30 p.m.

Nov. 28 (*Mon.*) — **Argentine North Eastern Railway Co. Ltd.** (Annual) River Plate House, Finsbury Circus, E.C., at 2.30 p.m.

Railway Share Market

The new Stock Exchange account opened on Monday with a small volume of business and a tendency to lower prices in most sections of the stock and share markets. Subsequently conditions improved and the general trend was for values to recover. Sentiment was assisted by the Prime Minister's speech relating to the trade position.

On balance securities of Home railway companies have again moved against holders, but on Wednesday the lower prices tended to attract some attention in view of the less depressing traffic returns for the past week. The market was also assisted by the announcement that unless the net incomes for **1938** are more favourable than at present anticipated by the companies, it will be necessary to make application for some relief in respect to labour costs. Nevertheless, the dividend prospects for the current year do not seem to be likely to improve, as the official view is that no material slackening in the decline in the revenue is indicated and that the fall in net revenues is likely to be substantially greater than is that of gross receipts.

Southern preferred became a firmer market around **5**6, aided by hopes of a dividend of 3½ per cent. and by the traffic increase of £15,000 shown for the past week. The deferred changed hands up to 13⅛. The **5** per cent. preference stock made the better price of **96**. Great Western ordinary reacted to 27½ at one time but later recovered slightly to **28**, there still being conflicting views as to the extent the directors will be prepared to draw on reserves for dividend purposes. The **5** per cent. preference stock made the better price of **92**. L.N.E.R. first and second preference were firmer following the news that the traffic decline for the past week was only **£9,000**. The debentures and guaranteed stocks were inclined to make improved prices as were those of the other main line railways, but in most cases quotations were not apparently tested by much business. L.M.S.R. participated in the better tendency shown in the middle of the week. The ordinary transferred up to 13⅛ and the **1923** preference and **4** per cent. preference up to **29** and **52** respectively. London Transport "C" was fairly steady around **76**.

Following the recent rise in Argentine railway securities as a result of the hopeful statements at the meeting and encouraging crop reports, sentiment has been affected by the rise in the Argentine exchange rate, although it is not expected this will apply to the railways' sterling remittances. Pending official news on this point, B.A. Gt. Southern reacted to 11½ while the **5** per cent. and 6 per cent. preferences moved down to 45 and 33 respectively. Central Argentine ordinary weakened to 10½, while the 4½ per cent. preference was no better than 27½ and the **6** per cent. preference went back to **34**. B.A. Western issues reflected the general trend, but in most cases the fall in prices has been out of all proportion to the volume of selling, and similar remarks apply to the debentures of the leading companies. Elsewhere, San Paulo and Antofagasta moved against holders. Canadian Pacific common shares and preference stock were firmer. American railway shares moved to higher levels on the strength of Wall Street markets following the election results. Union Pacifics improved **1**, and Atchisons ½.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1937-38	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1937	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1937	Prices: Lowest 1937	Prices: Nov. 9, 1938	Prices: Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	6.11.38	11,650	– 3,230	45	661,050	739,980	– 78,930	Ord. Stk.	29	10¼	9½	Nil
	Argentine North Eastern	753	5.11.38	9,950	+ 3,126	19	202,797	192,285	+ 10,512	„	19¼	6	5½	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	93½	60	80	5
	Bolivar	174	Oct., 1938	3,550	– 150	44	37,200	53,050	– 15,850	6 p.c. Deb.	9½	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	17	9	6	8 5/16
	Buenos Ayres & Pacific	2,806	5.11.38	71,030	– 1,054	19	1,321,095	1,488,897	– 167,802	Ord. Stk.	17⅛	5½	5	Nil
	Buenos Ayres Central	190	22.10.38	$113,100	– $21,300	17	$2,045,700	$2,415,800	– $370,100	Mt. Deb.	41½	18	16	Nil
	Buenos Ayres Gt. Southern	5,084	5.11.38	121,960	– 497	19	2,272,209	2,275,931	– 3,722	Ord. Stk.	33¾	13½	12	Nil
	Buenos Ayres Western	1,930	5.11.38	42,246	+ 1,551	19	720,161	860,361	– 140,200	„	31¾	11¼	8½	Nil
	Central Argentine	3,700	5.11.38	99,441	– 7,104	19	1,897,917	2,444,134	– 546,217	„	34¼	10¾	10½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	20½	4½	3½	Nil
	Cent. Uruguay of M. Video	972	29.10.38	19,612	+ 532	18	293,649	277,756	+ 15,893	Ord. Stk.	6 7/32	2	2	Nil
	Cordoba Central	1,218	—	—	—	—	—	—	—	Ord. Inc.	6¼	1½	3¼	Nil
	Costa Rica	188	Aug., 1938	23,553	– 1,064	9	46,815	49,305	– 2,490	Stk.	38	27	24	8 5/16
	Dorada	70	Sept., 1938	15,800	– 1,400	39	148,000	139,600	+ 8,400	1 Mt. Db.	107	106	105	5 11/16
	Entre Rios	810	5.11.38	16,483	+ 6,961	19	290,488	258,998	+ 31,490	Ord. Stk.	19 7/16	6	5½	Nil
	Great Western of Brazil	1,092	5.11.38	12,500	+ 1,800	45	312,700	342,300	– 29,600	Ord. Sh.	5/4	1/8	1/4	Nil
	International of Cl. Amer.	794	Sept., 1938	$371,340	– $15,056	39	$4,189,954	$4,341,014	– $151,060	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2/-	1/-	1/2	Nil
	La Guaira & Caracas	22¾	Oct., 1938	6,230	+ 2,075	44	53,110	51,820	+ 1,290	Stk.	8½	6	8½	Nil
	Leopoldina	1,918	5.11.38	22,278	+ 543	45	937,255	1,040,828	– 103,573	Ord.Stk.	9¼	3	2	Nil
	Mexican	483	31.10.38	$402,800	– $45,400	18	$4,606,800	$5,301,700	– $694,900	„	1½	1/4	1/8	Nil
	Midland of Uruguay	319	Sept., 1938	6,992	– 2,103	13	25,076	23,794	+ 1,282	„	1/8	1/2	1/2	Nil
	Nitrate	386	31.10.38	6,486	+ 2,384	44	122,292	126,347	– 4,055	Ord. Sh.	3 1/16	2	1¾	5 11/16
	Paraguay Central	274	29.10.38	$2,471,000	– $242,000	18	$53,260,000	$56,890,000	– $3,630,000	Pr. Li. Stk.	84	79¼	57½	5 5/16
	Peruvian Corporation	1,059	Oct., 1938	65,795	– 18,482	18	278,342	347,951	– 69,609	Pref.	14¾	4½	3	Nil
	Salvador	100	29.10.38	¢16,200	+ ¢4,000	18	¢199,461	¢215,834	– ¢16,373	Pr. Li. Db.	23½	21½	22½	Nil
	San Paulo	153⅓	30.10.38	26,642	– 6,473	44	1,361,440	1,428,319	– 66,879	Ord. Stk.	98½	56	35	11 7/16
	Taltal	160	Oct., 1938	3,885	+ 1,070	18	11,785	12,885	– 1,100	Ord. Sh.	17/16	11/16	5/8	16
	United of Havana	1,353	5.11.38	15,478	– 179	19	304,153	317,371	– 13,218	Ord. Stk.	5⅝	31/32	1	Nil
	Uruguav Northern	73	Sept., 1938	953	+ 126	13	2,770	2,420	+ 350	Deb. Stk.	10	2	2	Nil
Canada	Canadian National	23,723	31.10.38	1,304,576	+ 7,739	44	30,054,517	33,080,731	– 3,026,214	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	– 4 p.c.	Perp. Dbs.	77	62½	68½	5 15/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	101 7/3	94½	102½	3 7/8
	Canadian Pacific	17,186	31.10.38	1,118,200	+ 158,000	44	23,456,200	23,966,200	– 510,000	Ord. Stk.	18	7¼	7	Nil
India†	Assam Bengal	1,329	20.10.38	49,140	+ 13,699	28	789,930	736,081	+ 53,849	Ord. Stk.	86	73½	77½	3 7/8
	Barsi Light	202	20.10.38	3,075	+ 615	28	78,900	70,132	+ 8,768	Ord. Sh.	66½	46	58½	6 13/16
	Bengal & North Western	2,116	20.10.38	70,078	+ 312	3	138,783	129,863	+ 8,920	Ord. Stk.	317	301	283	6⅝
	Bengal Dooars & Extension	161	20.10.38	5,622	+ 769	28	81,855	81,482	+ 373	„	100	84	87½	7 7/16
	Bengal-Nagpur	3,268	20.10.38	171,300	– 876	28	3,732,038	3,818,563	– 86,525	„	101	89	94½	4¼
	Bombay, Baroda & Cl. India	3,085	31.10.38	240,675	– 11,775	29	4,960,125	5,047,500	– 87,375	„	113	110½	106½	5⅝
	Madras & Southern Mahratta	2,967	20.10.38	140,100	+ 9,486	28	3,017,343	2,889,902	+ 127,441	„	110	105	105½	8½
	Rohilkund & Kumaon	571	20.10.38	12,863	+ 149	3	25,238	24,813	+ 425	„	314	302	285	6 5/16
	South Indian	2,531⅔	20.10.38	116,958	– 5,389	28	2,331,554	2,346,405	– 14,851	„	103½	99½	102½	4⅝
Various	Beira-Umtali	204	Sept., 1938	83,497	– 14,556	52	1,037,185	975,721	+ 61,464	—	—	—	—	—
	Egyptian Delta	620	20.10.38	8,621	– 63	28	119,728	127,246	– 7,518	Prf. Sh.	31/-	3/4	1/2	Nil
	Kenya & Uganda	1,625	Aug., 1938	182,150	– 14,527	35	1,860,357	1,920,155	– 59,798	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48⅛	43½	45	7¾
	Midland of W. Australia	277	Sept., 1938	17,029	+ 2,026	13	44,686	37,926	+ 6,760	Inc. Deb.	98	93½	90	4 7/16
	Nigerian	1,900	24.9.38	22,295	– 18,610	26	751,848	1,216,978	– 465,130	—	—	—	—	—
	Rhodesia	2,442	Sept., 1938	410,764	– 21,548	52	4,950,384	4,635,398	+ 314,986	—	—	—	—	—
	South Africa	13,263	15.10.38	647,826	– 47,506	29	17,512,865	18,156,175	– 643,310	—	—	—	—	—
	Victoria	4,774	July, 1938	716,345	– 3,187	5	716,345	719,532	– 3,187	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value

Electric Railway Traction

Switchgear Testing

AT the request of a number of switchgear manufacturers, the N.P.L. has been considering the establishment of a short-circuit testing station capable of testing switches with a rupturing capacity up to 250,000 kVA., but as a result of the helpful collaboration of the owners of private testing stations, this proposal has been replaced by a scheme to use the existing private stations, which already have facilities believed to be greater than are available in any other country. Under the new proposals the existing testing stations will continue to issue their own certificates of rating and records of performance, but in addition will provide facilities for the issue of N.P.L. certificates in respect of circuit-breakers coming within an agreed range and which attain a standard of performance defined in the appropriate B.S. Specification. These facilities will be available to any British manufacturer, and the tests will normally be carried out to the requirements of B.S.S. No. 116, Part I, of 1937. The switchgear to be tested is to be limited at first to the ratings covered by that specification, subject to a maximum voltage of 11,000 and to a maximum rating of 250,000 kVA. Voltages lower than 3,300 will be considered as soon as the appropriate B.S. Specifications are available, and performance tests at non-standard voltages and capacities within these limits may be undertaken in special cases. The owners of the private testing stations had already provisionally decided to form an Association of Short-Circuit Testing Authorities, and this body is now being incorporated. The Department of Scientific and Industrial Research is to be represented on the committee of this association, and there will be a resident officer of the N.P.L. at each station. Further, the Department is to set up an advisory committee which will include the nominees of the owners of the present stations and of firms which do not own such stations, and also independent nominees of the Department. The short-circuit testing stations at present included in the scheme are those of the English Electric Co. Ltd. at Stafford and of the General Electric Co. Ltd. at Witton.

Aluminium Subway Train

ONCE again the Brooklyn-Manhattan Transit Corporation is endeavouring to improve the operating characteristics of underground railways by effecting an appreciable reduction in train weight. It will be recalled that some time ago two types of articulated train—one of stainless steel and the other of high-tensile steel—were introduced which were a good deal lighter than the normal stock (see issue of this Supplement for April 2, 1937), but a further reduction is to be gained with a three-car articulated set now under construction. Each axle is to be driven by an American General Electric 300/600-volt motor, and these, together with the control and auxiliary electrical apparatus are to be very similar to the equipment of the celebrated President's Conference Committee cars. Acceleration rates up to 4 m.p.h.p.s. will be within the capacity of the electrical equipment, and by the incorporation of dynamic, electro-magnetic track, and air brakes, retardation rates of well over this figure. The dynamic braking alone is being arranged to give a retardation rate of 4 m.p.h.p.s. during the first part of a stop. The air brake—with the rigging and shoes—is to be used only for the actual stop. Low-voltage d.c. for the control, brakes, and auxiliary equipment is to be provided by two motor-generator sets. Non-glare high-intensity lights are to be used in the passenger saloons, and a constant forced circulation of filtered air is to be maintained by a mechanical ventilation system. Aluminium alloys are to be used extensively in the construction of the train, and rubber-cushioned wheels and rubber blocks supporting the springs and pivots will assist in promoting quieter running. The nominal carrying capacity of a three-car set is 320 persons.

New Zealand Suburban Conversion

THE history of the Johnsonville suburban line out of Wellington, which route has just been electrified, dates back nearly 70 years. A railway appears to have been mooted first in 1874, and in 1877 a contract for a road was signed. Road construction was carried on until 1880, when a Royal Commission condemned the scheme, and the work was stopped after about £43,000 had been spent. Thereupon the citizens of Wellington held a "mass" meeting at which, it is recorded, 30 people attended. But the next year the Manawatu Railway Company was formed with a capital of £500,000, which sum was later increased to £850,000. A contract was entered into between the company and the Government in 1882, and in 1886 the line was finished as far as Longburn. The company was taken over by the Government in 1908 and a through connection to Auckland was completed in 1909. The steep grades (up to 1 in 40) and sharp curves of the Wellington—Johnsonville section have always made steam operation very difficult, and the numerous tunnels made matters still worse. Eventually, the Tawa Flats deviation was constructed to take the through traffic over an easier route, but to give easier operation and more comfortable travel the Johnsonville line—now purely suburban—was scheduled for conversion to 1,500-volt d.c. electrification. At the same time it was decided that the Tawa Flats main line deviation should be electrified between Wellington and Paekakariki, and that the trains should be operated by electric locomotives, whereas the Johnsonville route is worked by multiple-unit trains. Three English manufacturers have taken a leading part in the supply of the equipment for the Johnsonville and Tawa Flats conversions, and their work is described elsewhere in this issue.

THE CHICAGO, NORTH SHORE ELECTRIC LINE

51-*day strike expected to ruin future prospects*

THAT high-speed interurban electric line, the Chicago, North Shore & Milwaukee Railroad, which was described in the issue of this Supplement for January 11, 1935, has been in the throes of an employees' strike, and it seems doubtful whether the line will again meet its expenses. The railroad had its origin in the Bluff City Electric Street Railway Company, incorporated in 1894 with a capital of $200,000, and was reorganised as the C.N.S. & M. in 1916. It operated several short-distance start-to-stop schedules of well over 60 m.p.h. including two 15-mile runs in 12 min., *i.e.*, at 75 m.p.h. At the present moment the line is again in operation, the employees having agreed to pay cuts.

The following account of the line since its inception, and more particularly over recent years, is taken from the *New York Times* of October 2, and supplements our article of January 11, 1935.

Rusty rails getting rustier, stored up cars getting dustier, and only the spiders in the depôts doing any work.

That is the North Shore Railroad which was a shining example of successful, high-speed electric railroading. Today, after more than two months, no wheel is turning because of the strike of its 1,300 employees over a 15 per cent. wage cut.

In Milwaukee railroad and business circles the belief is growing that the grass is going to grow pretty tall between the tracks before the railroad runs again. Rumours persist that the North Shore will never resume.

Even the fact that the strikers have indicated a willingness to take 85 per cent. of their pay in cash and the balance in company scrip is not expected to help. A Federal Government official said that the trustee who suggested the scrip idea is finding that the road could not even find enough money, after suspending operations, to pay 85 per cent. in cash.

So it appears that another electric interurban road is going to fall victim to changing times and the era of "high financing" of the Nineteen Twenties and of Samuel Insull. For the North Shore was one of Mr. Insull's great dreams and one of the victims of his craving for over-expansion.

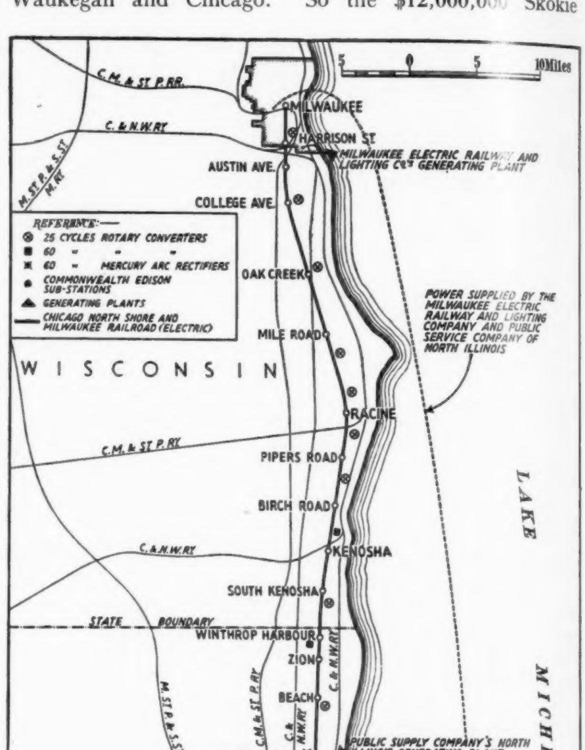
The North Shore was one of the lines which ushered in the day of the electric street car and those Victorian rapid transit trains that brought the farmer into town Saturday night and took the folks to the big city now and then in the days of the horse and buggy. It started as a trolley line in Waukegan and ran a bit south of that city in 1894.

Then came the period of building interurban lines all over the country, of selling stock to make that possible. In 1908 the line was extended south to Evanston, Ill., and north to Milwaukee, and a bit later it was run into Chicago over the "L."

The line was an important factor those days in the growth of Milwaukee and the suburbs of Chicago. It carried people from downtown Milwaukee to downtown Chicago and it took lots of business from the steam railroads.

Bankruptcy overtook it in the troublous early days of the World War, but that was only a temporary setback. New management came along and Mr. Insull got hold of the property after 1916 and it began to boom. It carried 16,146,802 passengers in 1923 and 445,848 tons of freight and took in $6,978,751 in operating revenues with its forty-two steel trains, some of them considered quite *de luxe*. It won prizes for high speed and, in the words of the American Electric Railway Association, "for carrying to fruition most of the things that have been talked about as the remedies for making interurban lines pay."

But Mr. Insull and Mrs. Harold McCormick had visions of developing a great new and beautiful residential suburb along the shores of Lake Michigan between Waukegan and Chicago. So the $12,000,000 Skokie



Map of the Chicago, North Shore & Milwaukee Railroad showing its relation to neighbouring lines

Valley "cut-off" of the North Shore was built to bring transportation to an otherwise inaccessible section and to reduce the running time between Milwaukee and Chicago.

The running time was cut. Trains reached seventy-five miles an hour and averaged sixty-five miles an hour between Milwaukee and Chicago, but—

Somebody forgot about the automobile. Anyway the auto changed from a chugging gas buggy to a quiet sedan that carried the family anywhere, any time, for less and less money. And people did not flock to Mrs. McCormick's new suburb.

Those 46 new miles of trackage with their 138 miles of electric trolley wires and their costly Spanish bungalow stations and the expensive electric substations, and the $600,000 new terminal in Milwaukee—largest electric railway station in the world—just slashed all profits away. For Mr. Insull's group had—with the aid of sales drives by employees—$21,522,000 in bonds oustanding by 1931, in addition to $20,000,000 of capital stock. It had a net operating annual loss for 1930 of $746,579 and it rushed to the R.F.C. to borrow $1,150,000 because it owed $175,000 in taxes in Illinois and Wisconsin and was unable to meet its then current obligations of $1,000,000 in interest on its securities.

So into receivership the line went in 1932. Those automobiles, motor trucks, and motor bus lines had cut the passenger business down from the 1923 high of 16,000,000 to an annual average of 7,800,000 by the summer of 1932. In the three years from 1929, the depression had cut passengers down from 12,500,000 in 1929 and freight fell off 39 per cent.

In 1937 the North Shore loss, after inclusion of the funded debt, was $1,179,767, or only $37,647 less than the debt of 1936. And according to latest figures, passenger business at the time of suspended operations was only at the rate of 1,260,000 passengers a year.

THE WELLINGTON ELECTRIFIED LINES IN NEW ZEALAND

A description of the supply, converting, remote control and signalling systems

THE energy for the Wellington—Johnsonville (suburban) and Wellington—Paekakariki (main-line) electrified sections of the New Zealand Government Railways is obtained from the hydro-electric system of the Public Works Department. It is taken from the grid substation at Khandallah at 11 kV. three-phase 50 cycles and is fed to the railway substation at the same place; there is an alternative 11 kV. feeder from the grid substation to the railway substation at Kiawarra, which runs *via* the Tawa Flats tunnels. At Khandallah and Kiawarra railway substations there are outdoor transformer sets which step-up the three-phase current to 33 kV. for transmission to the four remaining traction substations.

A total of six substations is required for the 38 route miles of the two electrified lines, and all are of the rectifier type with supervisory remote control operated from the main railway substation (already in existence for purposes other than traction) at Waterloo quay, Wellington. The six traction substations and their capacities are as follow:—

Kaiwarra (1,800 kW.)	Pukerua Bay (600 kW.)
Porirua (600 kW.)	Paekakariki (1,200 kW.)
Paremata (600 kW.)	Khandallah (1,200 kW.)

From these substations 1,500-volts d.c. is supplied to the overhead line through Bertram Thomas high-speed circuit-breakers which are capable of disconnecting the supply on the occurrence of any fault in 0·02 sec. These breakers are provided not only to form a connecting link between the substation and the contact line, but also to prevent the substation being damaged in the event of a fault occurring in the overhead system. The overhead equipment was designed in New Zealand, and many of the detailed parts were manufactured at the railway workshops at Woburn. The contact wire, consisting of hard-drawn copper, is 0·25 sq. in. in section, and the catenary wire, which supports this, is stranded hard-drawn copper of the same sectional area.

Converting Equipment

Reyrolle's armour-clad switchgear is used on the primary side of the transformers; it is located out of doors in the 33 kV. supply substations and inside in the 11 kV. substations. The rectifier equipments were supplied by the Hewittic Electric Co. Ltd., and incorporate glass bulb rectifiers with an individual bulb capacity of 300 kW.

The a.c. cables are brought into the back of the rectifier cubicles through trifurcating boxes and the supply is taken from these points to the anode fuses, oil-immersed anode chokes, and on to the anode terminals of each bulb. The d.c. output is taken from the cathode through an isolating link to the positive cable connection, which in turn connects to the high-speed circuit-breaker. Each cubicle has an individual ventilating fan, starting and exciter circuit, and the auxiliary circuits are controlled by relays and oil-immersed chokes fitted in each cubicle. Each 600-kW. set comprises two rectifier glass bulb units, together with a smoothing circuit; the smoothing equipment includes main series reactor and resonant shunt tuned circuits for 600 and 1,200 cycles a second.

The transformers are of the oil-cooled type and are situated outside each substation building. They are wound with a delta primary and 12-phase zig-zag secondary, and are arranged as self-contained units, complete with interphase transformers, auxiliary transformer, and fan choke control device.

Each complete set of converting equipment has a continuous rating of 600 kW. at a d.c. supply voltage of 1,600, corresponding to the nominal 1,500 volts in the contact wire; the overload capacities are 150 per cent. of full load for 60 min., 200 per cent. for 15 min., 300 per cent. for 5 min., 350 per cent. for 1 min., and 400 per cent. momentarily. On test at the Hewittic works the following efficiencies were obtained:—

¼ load..	96·5 per cent.
Full load	96·6 ,, ,,
¾ load..	96·6 ,, ,,
½ load..	96·3 ,, ,,
¼ load..	95·3 ,, ,,

The no-load losses were 4·8 kW. per 600-kW. set on the 11 kV. supply and 5·4 kW. on the 33 kV. supply.

Substation Control

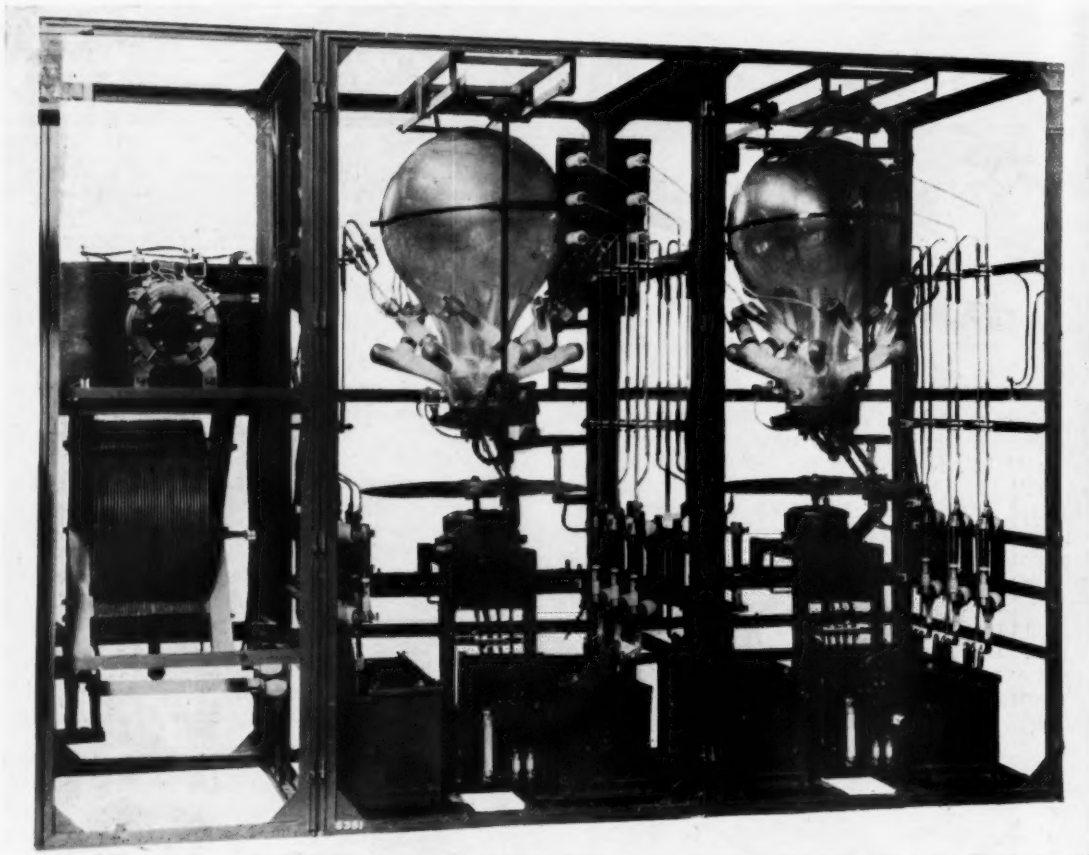
All the substations are designed to work unattended, and those of 1,200 kW. capacity, that is, those with two rectifier equipments, are provided with automatic load control, which causes the extra rectifier unit to be brought into service when the power consumption increases beyond the capacity of the rectifier actually working at the time. This happens in peak traffic periods, mainly in the mornings and evenings. As the demand for power decreases

with the passing of a peak period, the reserve rectifier unit is automatically switched out of use.

In addition to the switching done by the automatic load control, a system of supervisory control of all substations is provided, whereby ultimately the whole of the Wellington electrification system will be managed from a control room in the railway main substation on Waterloo quay. Until the Paekakariki main-line section is opened to regular electric haulage, the operator requires to manage only the Khandallah and Kaiwarra substations, both of which are rectifier substations equipped with automatic load control, and cater for the Johnsonville suburban line. Later on, when the whole system is in use, the rectifier substations at Porirua, Paremata, Pukerua, and Paekakariki, and a transformer substation at Glenside, will also come under the supervision of the Wellington operator. All these substations will be unattended and the one at Pukerua will have the automatic load control feature, similar to Khandallah and Kaiwarra, that is, the complete substation will normally be in operation only at times of heavy load.

In the control room at Wellington—which is staffed whenever there are electric trains running (continuously when the whole scheme is in use)—is a mimic diagram of the main connections at all of the substations, and corresponding to every circuit-breaker is a small key switch on this diagram.

Reyrolle's Centrovisory system of control has been adopted, and it has two main functions. First, it indicates to the operator in the control room the state of all circuit-breakers—closed or open. Associated with each circuit-breaker on the control diagram is a red and a green lamp, and when illuminated the red indicates "closed" and the green "open." If a circuit-breaker at any substation opens or closes through any cause the diagram immediately shows this. In addition, if the control operator did not cause the change to take place—that is to say, if a circuit-breaker opens due to a fault, or is operated by hand, then an audible alarm is sounded and the control room operator must acknowledge this by depressing a key-switch, which stops the alarm.



Twin-bulb Hewittic rectifier set with a nominal capacity of 600 *kW.; the momentary overload capacity is* 400 *per cent. The incoming a.c. is at a tension of* 11 *kV. or* 33 *kV., and the outgoing d.c is at a normal tension of* 1,600 *volts*

The second function is that the operator may open or close any circuit-breaker. The equipment functions on a principle similar to an automatic telephone exchange, each switch or unit of equipment being treated as a subscriber. If the operator wishes to close a circuit-breaker at Khandallah he presses the selection key on the mimic diagram corresponding to this circuit-breaker. This causes the equipment to select the circuit-breaker required just as dialling a number selects a wanted subscriber on the telephone. As the operation is required to be very reliable the equipment then automatically checks the selection of the unit required, and if correct a white lamp alongside the selection key lights up and tells the operator that a connection has been established with the circuit-breaker required. The operator is then free to either close or trip

the circuit-breaker with another key, and when it changes the indication given by the red and green lamps changes as already described.

When any additional rectifier units are brought into operation or shut down by the automatic load control the operator receives notice of these changes by the indications of the red and green lights on the mimic diagram and is therefore kept advised of what is going on.

Ample protection is provided whereby any faults, short-circuits, or other dangerous conditions automatically cause the circuit-breakers concerned to trip, thus cutting off the power, and the remote control system in no way qualifies or otherwise affects this feature. Further indicators are provided in the District Traffic Manager's train control office, so that the train-control operator has a continual indication of the condition of the line always in front of him.

Signalling and Traffic

Fully automatic signalling is being installed between Wellington and Johnsonville. Movement of the points at the various stations, depending on the traffic condition of the line, is controlled by the trains themselves. The points are automatically locked to prevent a train entering a single-line section if that section is not clear, and the starting signal is retained in the on position until the points are free. Provision is made whereby a train, having claimed a section, can be cancelled by a member of the train crew using a special key for the purpose, so

Control desk of Reyrolle remote control system

as to enable an opposing train on the section in advance going forward to make its crossing instead of having to wait until the first train had gone forward to the next station.

At Johnsonville special provision is made so that during certain hours of the day electric trains go to one side of the platform and at other times of the day to the other side of the platform, and, further, if one side of the platform is already occupied, then the points automatically set to divert the following train on to the other route.

Train-control telephones are being provided at all stations, and an indicating light will warn train crews that they are required to stop and speak on the telephone.

Provision is made at Ngaio and Khandallah for the signal cabins there to be switched into use, so that shunting of certain trains can be accomplished by means of the operation of the signal levers, but under normal working conditions the operation of these stations, including certain specified shunting movements of multiple-unit trains, can be carried out automatically without having to switch the signal boxes into use.

Mechanical train stops are installed for trains travelling down the 1 in 40 grade, so that, if the points are not correctly set, power will be cut off the train and the brakes automatically applied. At the Wadestown crossing loop, in addition to these facilities, an electrical train stop is installed which will again cut off power and apply the brakes if the speed of a train is higher than is prescribed. The telephone and communication circuits to Johnsonville have been entirely remodelled in connection with the electrification, and the open wires removed and replaced by lead-covered armoured cable.

Previous references to the Wellington suburban and main-line electrified sections and the rolling stock for them will be found in the issues of this Supplement for January 7 and July 22, 1938 (multiple-unit trains and electrification) and February 4, 1938 (locomotives). Trial trains began to run in May, and electric traction on the Johnsonville suburban line, $8\frac{3}{4}$ miles long, was officially inaugurated on July 2. The main-line section to Paekakariki is not yet turned over to electric traction. It is a new deviation, *via* the Tawa Flats, with a maximum grade of 1 in 57, compared with the 1 in 40 of the old main route *via* Johnsonville.

NOTES AND NEWS

Electrified German Light Railways.—Of the 14,150 km. (8,785 miles) of German light and private railways, a total of 750 km. (465 miles) was electrified at the end of 1936. Traffic on these lines was operated by 64 electric locomotives and 395 motor coaches.

Swiss Electrification.—Only the short Sonceboz-Court section of the Swiss Federal Railways was turned over to electric traction during 1937, but owing to more trains and higher speeds, the energy consumption rose by 13·4 per cent. to a total of 618·6 million kWh. The number of electric locomotives at the end of 1937 was 493.

Höllental Electrification Cost.—According to recent figures, the conversion of the Höllental line of the German State Railway to the 20-kV. single-phase 50-cycle system cost RM. 6,995,800, of which RM. 1,400,000 represents the cost of the four double-bogie locomotives. On a distance basis, the cost is equivalent to RM. 126,000 per route km. and RM. 76,000 per track km. The conversion was completed at the end of 1935, but the four locomotives were not delivered until January-August, 1936.

Big Italian Electric Opening.—The Milan-Bologna-Ancona and Rome-Leghorn routes of the Italian State Railways are due to be turned over to 3,000-volts d.c. electric traction on November 14. Actually, the d.c. system on the second route has been extended north to Via Reggio, supplanting the existing three-phase line between Leghorn and that town. North of Via Reggio, the lines are still operated on the 3,700-volt three-phase system. The conversion of the Milan-Ancona and Rome-Ligurian coast lines has added 458 miles to the electrified routes of the Italian State Railways.

? . . . two considerable controversies are in progress seriously affecting the life and happiness of London in respect of the impending war. Controversy Number One concerns the payment of the costs of the conversion of some London or near-London power station to enable it to provide extra direct current to electric lines running south out of London.

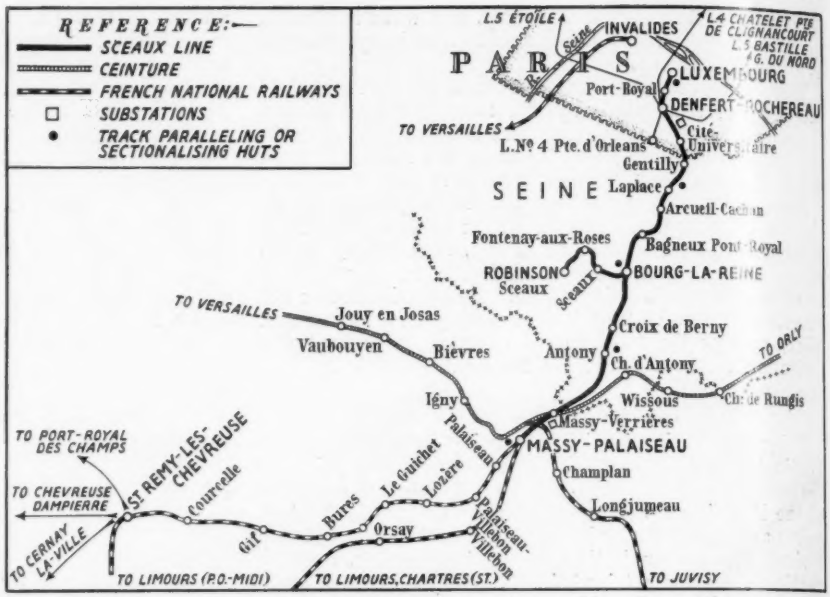
Between Berchtesgaden and Godesberg it was discovered that since the vastly greater part of London current consumed is alternating, there is in point of fact only one power station effectively providing direct current to the southern electric lines.

Asked what would happen if some one dropped a bomb on that power station, experts replied that electric traffic on the southern lines out of London would forthwith cease.—*The Week, October* 26.

XUM

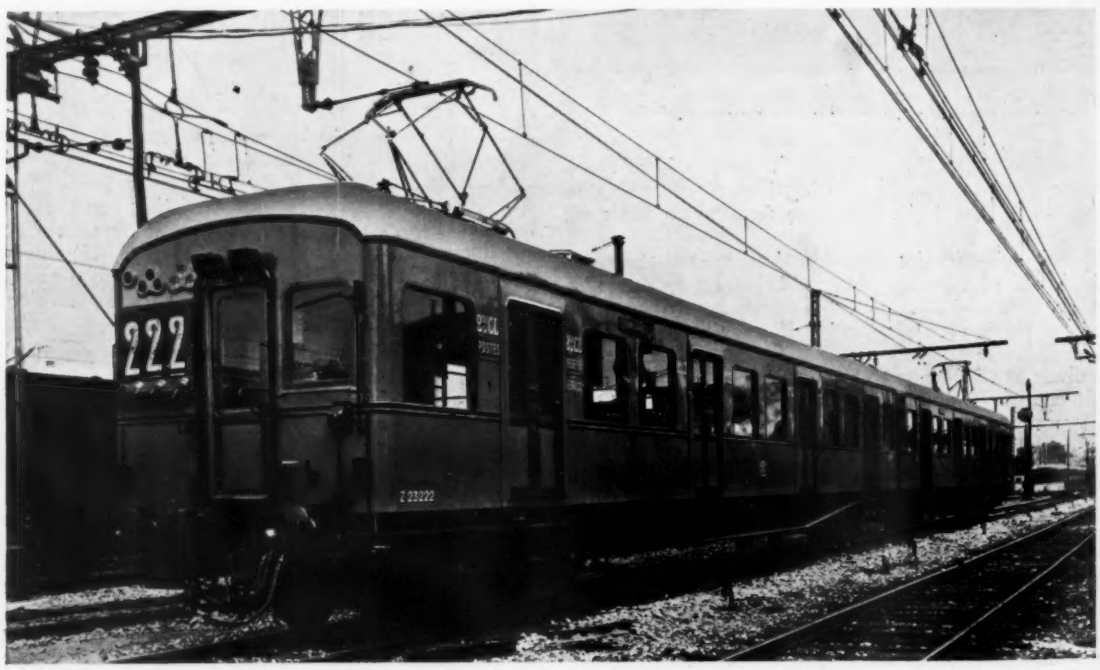
CONVERSION OF PARIS OUTER SUBURBAN LINE

Direct trains take 15 min. over 10½-mile line, and trains with 11 stops 25 min. The route mileage just electrified totals 12½



FROM 1857 until January 18 of the present year, the lines from Paris to Sceaux-Robinson, Massy-Palaiseau and Limours were worked by the Paris-Orleans Railway, but they were connected with the rest of that company's system only by a shuttle service over the route between Massy-Verrières and Orly, although there were connections with Juvisy and Versailles by means of the Ceinture Railway. This isolation arose out of their development from an independent 5 ft. 9 in. gauge line opened between Sceaux and Denfert-Rochereau, *via* Bourg-la-Reine, in 1846, and worked by Arnoux articulated units which were supposed to be suitable for lines laid to the natural contour of the land. The P.O. Railway took over the line in 1857, and began to extend it southwards from Bourg-la-Reine, first to Massy-Palaiseau and then as far as Limours, which town was reached in 1867. These lines were converted to standard gauge in 1883, and the Arnoux tractors scrapped. The extension inwards from Denfert-Rochereau to the present Luxembourg terminus in Paris, through a 1½-km. tunnel, was undertaken in 1895.

Because of the difficulties of steam working between stations set very closely together, and partly in tunnel, electrification has been envisaged for a good many years, but as the line was always classed as of local interest, conversion was deferred until a decision was reached, in 1932, to transfer the line from the P.O. Railway to the Department of the Seine. The State sanction followed various agreements between the Department of the Seine, the P.O. Railway, the City of Paris, and the Paris Metro,



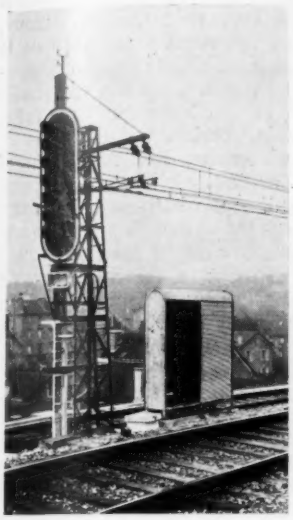
One of the 1,000-h.p. twin-car sets for the 1,500-volt d.c. Sceaux lines

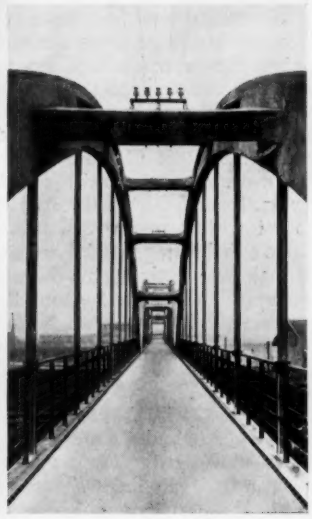
Top centre.—The new station at Bourg-la-Reine

Below.—Colour-light signal and relay box

Bottom centre.—The flyover junction at Bourg-la-Reine

Below.—Concrete footbridge connecting the Sceaux and Ceinture stations at Massy-Palaiseau





whereby the P.O. was to electrify the line on behalf of the Department, and when conversion was completed the working of the line would be transferred to the Metro. The Act governing these changes is dated April 10, 1932, but official sanction is dated August, 1932.

Electrification was completed last year, and public electric services under the management of the Metro began on January 18 last, over the line from Luxembourg to Massy-Palaiseau and the branch from Bourg-la-Reine to Sceaux-Robinson. The French National Railways are now engaged in converting, on behalf of the Department of the Seine, the extension from Massy-Palaiseau to St. Rémy-le-Chevreuse, on the line to Limours, and this line will continue, nominally at least, to be worked by the National Railways, although actually the Metro trains will be prolonged from Massy to St. Rémy. There is no physical connection with the Metro, although there is interconnection for passengers at Denfert-Rochereau by means of an underground passage between the Metro and Sceaux line stations. The rolling stock and the system of electrification are quite different from those used on the Metro in Paris.

Engineering Works

A good deal of civil engineering work was necessary to bring the line up to date and fit it for a frequent service of electric trains, and it was these works which were mainly responsible for the delay in the inauguration of electric traffic. Between Denfert-Rochereau and Gentilly stations, the cutting through the park of the Cité Universitaire has been transformed into a tunnel 1,700 ft. long. One of the principal works was the complete realignment of the junction of the Sceaux-Robinson branch at Bourg-la-Reine, including the provision of a flying junction. The work of eliminating the numerous level crossings was begun by the P.O. Railway as long ago as 1928, but this work was completed, and numerous under and over bridges strengthened or renewed as part of the conversion scheme. Massy-Palaiseau and Laplace stations have been completely rebuilt and all the others partly rebuilt. At the Luxembourg station a berthing siding has been inserted between the two principal platform lines, and a 330-ft. inspection pit excavated below one of these platform tracks. There is a berthing siding at Laplace and similar sidings and a double-track shed at Massy-Palaiseau. At this last-named station there is also a long ferro-concrete foot and truck bridge, spanning many lines, and giving connection between the Sceaux and Ceinture stations. A small repair shop to deal with the rolling stock has been erected at Montrouge. A new halt has been built at Bagneux, between Arcueil-Cachan and Bourg-la-Reine, and new goods sheds have been provided at Denfert, Arcueil-Cachan, Bourg-la-Reine, and La Croix-de-Berny. A complete relaying programme has been carried out, and all the running lines are now laid with 93-lb. rails and the sidings with 73-lb. rails.

Supply and Distribution

Current for the Sceaux lines is furnished from the Ivry-Port generating station of the Soc. d'Electricité de la Seine, and from the transformer station of the Union d'Electricité at Arcueil. In each case the supply is at 10,500 volts 50 cycles three-phase. The line current is 1,500 volts d.c.

There are two substations along the line, one, known as Montsouris, being adjacent to the repair shops at Montrouge, and the other, known as Villaine, at the other end of the line between Massy-Verrières and Massy-Palaiseau. The substation at Villaine has two 2,000 kW. 1,500-volt rotary converter groups, each consisting of two 1,000 kW. 750-volt sets coupled in series. One group is under semi-automatic control, and the other is controlled manually. There is space for the installation of a third group, should this be necessary with the electrification of the St. Rémy-le-Chevreuse extension. Montsouris substation contains four 2,000 kW. groups; one of these is controlled semi-automatically and the other three manually. A substation is to be provided at Gif for the normal

supply to the St. Rémy line. There is a sectionalising cabin located at Bourg-la-Reine, and its breakers are controlled partly from Montsouris and partly from Villaine. Other equipment includes track-paralleling huts at Luxembourg, Laplace, Sceaux-Robinson, Antony, and Massy-Palaiseau. Opposite each substation and at the junction at Bourg-la-Reine is a neutral section in the overhead structures, so that the train pantographs do not parallel two sections fed from different points.

In general, the overhead construction follows P.O. standards as used on the Les Aubrais—St. Pierre and Vierzon—Brive sections, and comprises an independent system for each track. The contact line consists of two cadmium-copper cables with a cross-section of 107 sq. mm. supported by droppers of 7 mm. diameter from an auxiliary copper carrier of 104 sq. mm. section. The main catenary is a bronze cable with a cross-sectional area of 116 sq. mm., and with an ultimate strength of 44 tons per sq. in., supported through Hewlet two-section isolators from the steel masts at a normal height of 18 ft. 10 in. above rail level. Special construction has been necessary through the Paris tunnel because of a great variation in width and height throughout the tunnel length; the minimum height of the contact wire here is 15 ft. 1 in., and in places the overhead system is formed only of the main catenary and the two contact cables. Between Montsouris and Villaine substations is an additional copper feeder cable with a cross-sectional area of 262 sq. mm., and this raises the conductivity of the whole system up to an equivalent of 662 sq. mm. of copper. The steel masts are situated 206 ft. apart on straight sections, but on the sharpest curves this span is brought down to 60-74 ft. Tensioning weights are carried at a maximum distance of 3,900 ft.

Rolling Stock

The trains are operated by two-coach sets, each of which is a motor-coach more or less permanently coupled to its fellow. Each car is equipped with two 250-h.p. nose-suspended motors, so that the power available for a two-car set, taring 90 tons and weighing about 130 tons when fully loaded, is 1,000 h.p., and the power weight-ratios of 11 h.p. per ton of tare and 7·7 h.p. per ton of gross is enough to enable very high rates of acceleration to be attained. This gross weight of 130 tons is equivalent to 180 seated passengers and 450 standing. Each car is 68 ft. long and 10 ft. 6 in. wide. Both traction motors are mounted on one bogie, and are proportioned to give a maximum train speed of 50 m.p.h. Jeumont camshaft control is fitted and is operated by an electric servo motor fed from a 48-volt battery. The normal lighting and heating circuits are taken from the contact line at a tension of 1,500 volts, but the emergency lighting is on a 48-volt circuit. The doors are opened and closed pneumatically by the guard. At each end of the train is a Willison-Robinson automatic coupler for mechanical and pneumatic connections, but the electric jumper connections are coupled up by hand. A repetition of the signal positions is given in the driving cab. The mechanism is operated by a series of four electromagnets on the track and four similar magnets below the car; these control the signal lights on the driver's repeater board and also mark on the recording band of the Teloc speedometer the actual position of each signal.

Double-bogie locomotives equipped with four of the 250-h.p. nose-suspended motors are used for freight traffic. They have a length of 41 ft. 6 in. and a weight of 54 tons; the maximum drawbar tractive effort is about 23,000 lb. The bogies are of the equaliser type and are very similar to the driving bogies of the motor-coaches. Like the motor-coaches, the locomotives have only one pantograph. The all-steel body is built up on an underframe of steel channel sections, and part of the interior is used for the carriage of light goods and parcels. Multiple-unit control is incorporated.

Traffic

Greatly increased travelling facilities have been provided by the Metro. The 28 steam trains a day in each direction have been replaced by over 180 electric trains. During the rush hours, viz., from 6.30 to 8.30 and from 17.30 to 19.30 there are three trains every quarter of an hour out of, and into, Luxembourg. The first is a direct train stopping only at Port Royal, Denfert-Rochereau, Antony, and Massy-Palaiseau; the second stops at all stations to Massy-Palaiseau; and the third at all stations to Sceaux-Robinson. During the day there is a 15-min. service to both Massy-Palaiseau and Sceaux-Robinson, and after eight o'clock at night a 20-min. service.

The line is divided into sections, and fares charged accordingly. On the inner, or first, section, from Luxembourg to Cité Universitaire, the fare is the usual flat rate of the Paris Metro, now 1·10 fr. second class. The four other sections each have a length of approximately 4 km.; three of them, in the Department of the Seine, have a second class fare of 55 centimes plus 5 centimes tax; the fourth section, located in the Department of Seine-et-Oise, has a fare of 55 centimes plus a 25 centimes tax second class, the higher tax being due to meet loans raised to contribute towards the cost of electrifying the St. Rémy line. The tax levied by the Department of the Seine is to defray the cost of eliminating a number of level crossings. Season ticket rates are cheap, a worker's weekly season between Massy-Palaiseau and Denfert-Rochereau, for example, costing only 16 fr. second class.

Signalling

Power and automatic colour-light signalling has been adopted, but owing to the services being uniform and of a local character, the code of signal aspects differs from the standard laid down by the State in 1930 for the main-line railways. The three-block four-aspect system is used, and has the following indications:—

Two red lights	Stop; then proceed with caution.
Two yellow lights	Caution; next signal at stop.
Three yellow lights	Warning; next signal at caution.
One green light	Proceed; all clear.

There is in addition a braking distance between "caution" and "stop" aspects, to make doubly sure that a driver is aware that he is approaching a "stop" signal. The minimum braking distance on the level is 437 yd. for a top speed of 50 m.p.h. For trains to run satisfactorily under "clear" signals they must be at least 1,420 yd. apart, which means a headway of 2 min. at 25 m.p.h. Where stations are less than this distance apart the effects of stopping and starting must be specially considered, but the distance of 437 yd. (400 m.) is maintained from the "caution" signal to the fouling point, the preceding signals being closed in, with the last rail joint of the section governing their change from "warning" to "caution" placed at the same distance ahead. This overlapping at times equals the length of a block section. In the signal boxes the controlled signals are distinguished by a plate bearing the letter M (Manœuvre) in reflectors, and can give the following additional indications:—

One red light	Absolute stop.
One yellow light .. .	Proceed on diverging route.

(Siding signals show violet for "stop" and lunar white for "proceed.")

Whenever the single red or single yellow aspect appears, the two preceding signals automatically show "caution" and "warning" respectively. At certain points, audible signal indications are given to the train driver.